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VOLUME I, NUMBER 1

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JANUARY 1947

INCLUDED IN THIS ISSUE:

After the President's Conference
Zoning for Parking
Driver Attitudes
New York's Parking Problem
Seven Steps to Safety
Parking Treatments

THE ENO FOUNDATION FOR HIGHWAY TRAFFIC CONTROL
SAUGATUCK, CONNECTICUT

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The New Quarterly

AN EDITORIAL BY COLONEL ROBERT C. F. GOETZ

This is the initial issue of the Traffic Quarterly.

The decision to undertake the publication of a quarterly magazine devoted exclusively to the improvement of highway traffic was made only after mature consideration. Many experts and professional men of long experience in the field of traffic have sound and logical ideas and methods for the improvement of the present chaotic conditions in traffic. It is hoped that this small publication will provide them a medium for the expression and distribution of their ideas and views. It is hoped that each issue will warrant the approbation of an unbiased and broad approach to all phases of the traffic problem.

While the Eno Foundation may not fully subscribe to all the expressions and views published, it welcomes the opportunity to publish them. The Foundation sincerely solicits the cooperation of everyone interested in traffic and feels that such cooperation is necessary to the success of the Quarterly. It realizes that it is entering a new field but by so doing it feels it is providing a medium for expression that does not now exist and that by so doing it may prove to be a worthwhile contribution to the one objective of the Eno Foundation, which is the improvement of traffic conditions.

Traffic Quarterly

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After the President's Highway Safety Conference

BY MAJOR GENERAL PHILIP B. FLEMING

General Philip Bracken Fleming is Administrator of the Federal Works Agency. He was Chairman of President Truman's National Highway Safety Conference at Washington last April. In 1911, General Fleming was graduated from the United States Military Academy and commissioned in the Engineers. He was executive officer of the Federal Works Administration and was in charge of the Passamaquoddy Project.

THE PRESIDENT'S Highway Safety Conference, the first ever held in the United States, brought together for three days in May the Nation's best intelligence in the highway safety field.

The Conference adopted an Action Program composed of a number of important elements. There were recommendations in regard to education, engineering, legislation, enforcement, accident records, motor vehicle administration and public information.

If any optimists had supposed that traffic fatalities would instantly cease upon the adoption of such a program, they already have been disappointed. Traffic fatalities are continuing, although, relatively, there has been some improvement. It is now possible to predict that fewer persons will be killed on our streets and highways in 1946 than was thought likely when the year opened, but there will still be fatal accidents, and many of them.

Experience since the Conference adjourned on May 10, simply proves what already was recognized, that no miracles are possible in this field. The elimination of traffic deaths cannot be brought about by fiat, by adopting programs, by passing resolutions. It is a continuing task, and calls for the concerted efforts of our entire population of 140,000,000.

Those of us who arranged the Conference and directed its work were under no illusions. We knew that we were opening a campaign, not celebrating a victory. What we expected was that the impetus for traffic safety generated at the meeting would spread throughout the

country in ever-widening circles until the efforts of everyone that could be brought to bear on the problem would be enlisted.

The delegates—and they included the governors of several of the states, mayors of many cities, educators, engineers, legislators and publicists—were expected to take home with them the recommendations arrived at and apply them in the various states and in their own local communities with such modifications as might be made necessary by varying local conditions. This, as we knew, would take time. The efforts of the police, the courts, of educators and others, could not be revitalized instantaneously. Organizations would have to be perfected and leadership would have to be found.

State legislatures were urged to overhaul their traffic laws in the interest of uniformity. This is especially necessary in regard to the licensing of drivers and the inspection of motor vehicles. But by May most of the few legislatures that met in 1946 had already adjourned. Progress here cannot be expected before next January when most of the legislatures reconvene.

The need for better highway engineering also was recognized but here, again, results can come about only gradually. Although the Congress has authorized a three-billion-dollar highway program over a three-year period to be achieved by Federal and State cooperation, the volume of road construction this year will be much less than was originally contemplated. We know how to build safer highways but it will be some years before the projected program can be completed.

The Federal Works Agency, in cooperation with State Highway departments, has been at work on a program of uniform highway marking and directional signs. But, of course, all the hundreds of thousands of highway signs now in use cannot be changed quickly.

It was hoped, and recommended, that the Governors of the states would call safety conferences paralleling the President's, to work out State programs, and that the mayors of the larger cities also would call conferences of representative citizens to hand-tailor the Action Program to meet local needs. I think the first of the city conferences was that held in Pittsburgh June 26. Governor Dewey of New York and Governor Lausche of Ohio called conferences in advance of the President's Conference.

North Carolina and New Jersey held state conferences in April, the same month in which the President's Conference was held. Other state conferences held during the summer were in Alabama, July 2; California, June 7; Colorado, August 6-7; Indiana, July 17; Minnesota, August 23; Montana, July 12; Pennsylvania, August 19; South Carolina, July 30-31; and Washington, August 26.

Fall conferences were held by the following states: Utah, September 4; Iowa, September 13; Michigan, September 17; Nebraska, October 31–November 1; Florida, November 7, and Oregon in late November. Vermont decided against holding a conference.

A notable contribution was the police traffic safety check made under the auspices of the International Association of Chiefs of Police in May and June. The results of the check were summarized in a report by Lieutenant Colonel Franklin M. Kreml, chairman of the Association's Safety Division, and presented to President Truman by Fred A. Roff, chief of police at Morristown, New Jersey, and president of the Association.

The check began throughout the United States, Canada and the city and county of Honolulu, T. H., on May 15, five days after the President's Conference adjourned, and ran until June 30. During that period traffic officers were instructed to inspect every motor vehicle involved in an accident or in a traffic violation, and in addition drivers of thousands of cars submitted their vehicles to inspection voluntarily.

Particular attention was given to rear and stop lights, front lights, brakes, windshield wipers, horns and tires, the correct functioning of which is almost directly related to safety. A total of 2,860,346 vehicles were checked, and 922,775, nearly one-third, were found to be mechanically defective in one or more respects. Of the total number inspected, 142,270 were in Canada, where the proportion found to be defective was about the same as in the United States.

Among the 2,718,076 vehicles checked in the United States, the number of defects found, by categories, and the percentage of defects of each type to the total number of defects, were listed in the report as follows:

Defects	*Number*	*Per Cent*
Rear and stop lights	331,857	28.7
Front lights	210,744	18.2
Brakes	153,370	13.3
Windshield wipers	94,879	8.2
Horns	82,723	7.1
Tires	50,109	4.3
Other	233,404	20.2
	1,157,086	100.0

This proportion of one mechanical defect to every two cars on the highways merely documents the fact that the average age of cars in use is growing greater month by month, that they are mechanically deteriorating and more subject to accidents. The vast number of new cars which were expected to be on the streets by the summer of 1946 are yet to be produced.

Owners of cars were urged, or instructed, to have defects corrected, but perhaps the most beneficial, if less tangible, outcome of the traffic check was the widespread publicity that accompanied it, and the wide impact of the slogan, "Check your driving—check your car—check accidents." The public as a whole, and even the police themselves, have been made far more conscious of the relationship between the mechanical condition of the car and safety on the highway.

President Roff reports that a number of the states—including Rhode Island, Pennsylvania and South Dakota—and a large number of city police departments expect to continue the traffic check indefinitely.

Detailed information is not available for all cities. If Washington, D.C., may be accepted as typical, then certainly police activity has been greatly intensified. In the Nation's capital traffic regulations appear to have been far more rigidly enforced this summer than formerly, and the penalties imposed by the courts upon violators have been relatively severe. That these measures are having the desired effect is indicated by the fact that traffic fatalities in the District in the first eight months of 1946 were a third lower than in the corresponding period of 1945.

However, continuing benefits from police activity will depend to a considerable extent upon the willingness of city councils to appropriate adequate funds for personnel and equipment. A recommendation of the President's Conference was that a special police traffic unity be created in the police departments of the larger cities to supplement the enforcement activities of the uniformed police generally. Policemen are busy people with many duties to perform. All of them cannot be expected to continue to concentrate upon traffic problems without some neglect of other important work. The special police traffic unit is the only possible answer in the larger cities. A body of men, especially trained and equipped, is needed to devote full time to the problem. But able men cannot be expected to undergo the necessary training and make a career of police traffic work unless salaries are at least comparable to those paid in private industry for similar responsibilities. If we want traffic safety we must be willing to pay the price of traffic safety. Otherwise we may expect to see a repetition of the old "spasm" method of enforcement which has never yet produced permanent results.

The interest of the newspapers and radio stations unquestionably has increased. Most of the newspapers that come to my attention are devoting more space than formerly to traffic safety and, best of all, are giving wholehearted support to police campaigns against violators. It is not too much to hope that the time is coming when it will avail little to know a fellow who knows a judge. All of the radio networks, I believe, are presenting almost daily programs preaching safety and emphasizing the individual responsibility of the motorist, and some of these have been dramatically compelling. The number of invitations I have received since last May, as General Chairman of the President's Conference, to speak about its work over the radio and before various organizations may also be taken as some indication of widening interest.

On September 4, President Truman established a Federal committee on Highway Safety to work with state and local governments and with national organizations for the reduction of traffic accidents, thus carrying into effect a recommendation which I had made to him in my capacity as general Conference chairman.

The committee is to be composed of one representative each of

the Public Roads Administration of the Federal Works Agency, the National Bureau of Standards, the United States Office of Education, the Federal Bureau of Investigation, the War, Navy, Agriculture, Interior and Post Office Departments, the Interstate Commerce Commission, and the Federal Interdepartmental Safety Council.

In an executive order establishing the committee the President said, "The Committee shall promote highway safety and the reduction of highway traffic accidents, and, to this end, shall encourage Federal Agencies concerned with highway safety activities to cooperate with agencies of state and local governments similarly concerned, with nation-wide highway safety organizations, and with national nonofficial highway safety organizations, as the committee may determine."

For those who are interested in statistics, the monthly reports of fatalities compiled by the National Safety Council will be found of interest. The peak year for traffic fatalities in the United States was 1941 when 37,512 persons were killed. The table below gives the number of such deaths by months for the first seven months of 1946, and the percentage increase or decrease by months these fatalities represent compared to the corresponding months of 1945 and 1941.

		Percentage increase or decrease compared to 1945	*Percentage increase or decrease compared to 1941*
January	2,880	+ 49	+ 1
February	2,480	+ 45	− 6
March	2,740	+ 39	− 1
April	2,730	+ 47	+ 4
May	2,410	+ 36	− 21
June	2,510	+ 27	− 19
July	2,530	+ 21	− 23

If traffic fatalities continue the remainder of the year at the same rate we shall have more deaths than in 1945, but some 6,000 less than in 1941. However, comparison with 1945 is somewhat misleading. Until the middle of August last year gasoline rationing restricted driving, so that there have been many fewer deaths in 1946

in proportion to miles driven. It is also significant that in May, June and July, when traffic fatalities usually rise sharply, there was an actual decrease below the fatalities of the first four months.

On the whole, therefore, it seems safe to say that the President's Conference set in motion a chain reaction that is bearing fruit. Much hereafter will depend upon our determination to keep up the work under way and intensify it. If we weaken the gains already won may be lost.

Eternal vigilance is the price of highway safety no less than of liberty.

Zoning Applied to Parking

BY CHARLES S. LE CRAW, JR.
and
WILBUR S. SMITH

Mr. Le Craw is a graduate in Traffic Engineering from the Bureau of Highway Traffic of Yale University. He is resident traffic engineer of the Eno Foundation, and Associate Editor of "Traffic Engineering" magazine. His thesis, "An Economic Study of Interior Block Parking Facilities," is now being published jointly by Yale University and the Eno Foundation.

Mr. Smith is Associate Director of the Bureau of Highway Traffic of Yale University. He is Technical Advisor of the Eno Foundation for Highway Traffic Control, Secretary-Treasurer of the Institute of Traffic Engineers, Traffic Consultant with the Federal Bureau of Investigation, and Chairman of the Committee on Traffic Operations of the Highway Research Board.

ZONING has long been used by government agencies to control land usage and development. It is designed to promote and protect the safety, convenience, health, morals and general welfare of the community.

Recently, a major municipal problem has been attacked through the use of zoning. This problem—parking facilities for automobiles—exists in every city in the United States. To prove there is a problem, simply drive into the central business districts of any American city and attempt to park in the vicinity of some predetermined point.

Attempts have been made to alleviate the parking problem by strict curb regulations. Curb control is necessary, but since there is insufficient curb space it alone will not solve the problem of providing adequate parking space. Additional space off the street must be made available. If such space is not provided, business will be dispersed to outlying areas where it is readily accessible to the motoring public. Such decentralization, if rapid and uncontrolled, is dangerous, for the central business districts of cities pay a large proportion of the taxes. In New Haven, Connecticut, the central district pays 20 per cent of the total city property tax on only 1.5 per

cent of the tax paying area of the city.[1] Further, it disturbs healthy city growth and in time creates undesirable blighted areas.

Tax evaluations in the downtown district of Baltimore, Maryland, dropped 30 per cent in ten years.[2] Such economic losses are detrimental to the welfare of a city and become acute if the city is bounded by incorporated places. Attributed directly to an acute shortage of terminal facilities, these economic losses can be reduced by providing proper parking facilities for the central district.

In the absence of initiative on the part of merchants, or other civic groups, government must take steps toward solving the parking problem. One such step involves the use of zoning powers granted to the city in its charter or through state enabling legislation. This use of zoning powers to regulate parking has been employed for over twenty years and many interesting experiences have resulted. In order to assemble these experiences and pass them on to other cities, the Eno Foundation conducted a study of existing zoning ordinances in various cities throughout the United States.[3]

CONDUCT OF STUDY

In August 1946, information was sought from city engineers and city planning commissions of the 1,060 cities in the United States with 1940 populations of 10,000 or greater. Replies were received

Table I

SOURCES OF INFORMATION ON CITY ZONING ORDINANCES FOR PARKING AND LOADING

Population	*Number of Cities*	*Information Furnished*	
		Number	*Per Cent*
10,000–25,000	649	289	44.5
25,000–50,000	212	146	69
50,000–100,000	107	76	71
Over 100,000	92	75	81.5
Total	1060	586	55.5

[1] "Tomorrow Is Here," City Plan Commission, New Haven, Connecticut, 1944.

[2] "Keep Customers Coming," American Retail Federation, 1945.

[3] A complete report on this study can be obtained from the Eno Foundation for Highway Traffic Control, Saugatuck, Connecticut.

from cities in all forty-eight states and the District of Columbia. Of the 1,060 cities contacted, 586, or 55.5 per cent submitted information. Table I shows the returns by various population groups.

Excluding states which have only one city in the group contacted, the state of Washington rendered the greatest return, with 92 per cent of its cities over 10,000 population submitting answers to the study.

CITIES WITH ORDINANCES

Of the 586 cities furnishing information, 70, or 12 per cent reported the existence of ordinances requiring the provision of off-

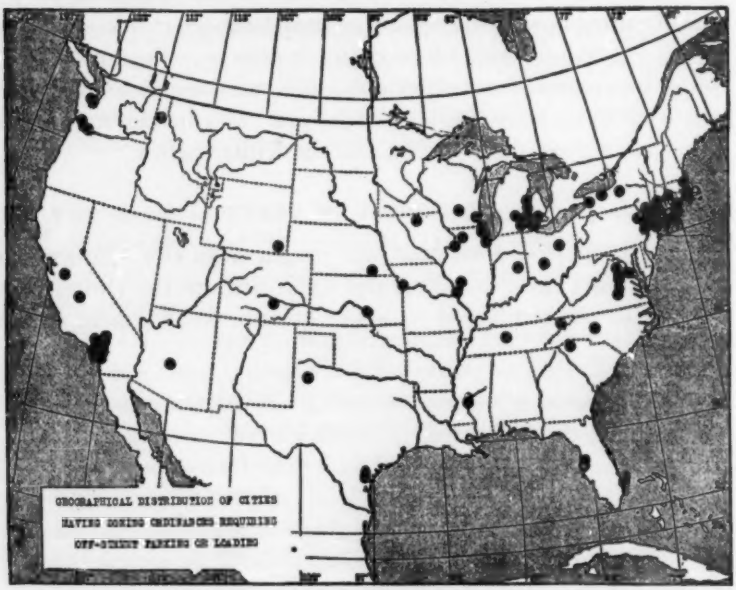


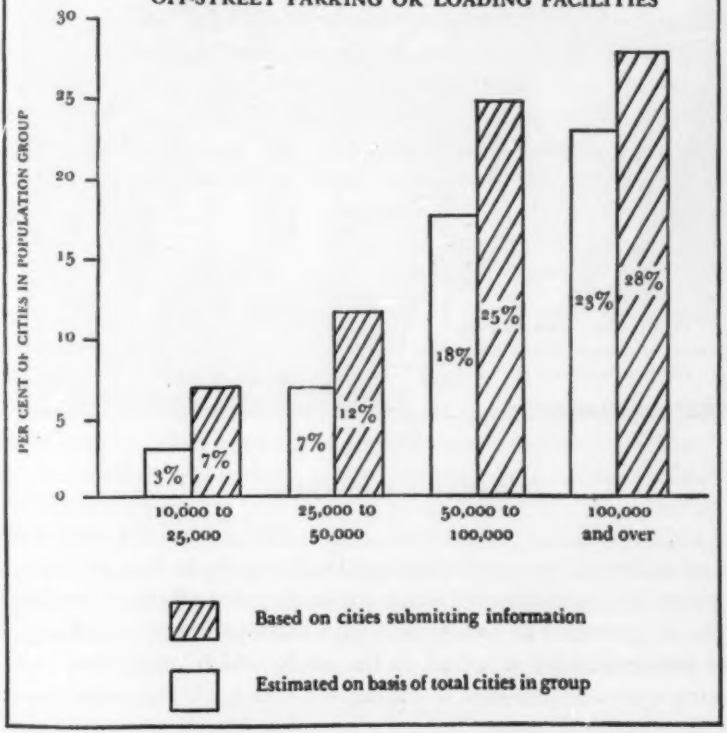
FIGURE 1

street parking or loading facilities. The geographical distribution of these cities is shown in Figure 1. Twenty-five per cent of the cities reporting in the population group from 50,000 to 100,000 submitted zoning ordinances affecting parking and loading. Figure 2 shows the percentage of cities in each population group having the zoning ordinances.

Based on replies, 7 per cent of the cities with populations from 10,000 to 25,000; 12 per cent with populations from 25,000 to 50,000; 25 per cent with populations 50,000 to 100,000; and 28 per cent with populations 100,000 and over, have zoning ordinances. Since

FIGURE 2

CITIES HAVING ZONING ORDINANCES REQUIRING OFF-STREET PARKING OR LOADING FACILITIES



it is likely that information was obtained from most of the cities with such ordinances, percentages based on the total number of cities in each population group probably more closely represent actual conditions. For the four population groups, these values are: 3 per cent, 7 per cent, 18 per cent, and 23 per cent respectively.

Nineteen states have no cities with zoning ordinances pertaining to off-street parking or loading facilities. The distribution of these states is shown in Figure 3.

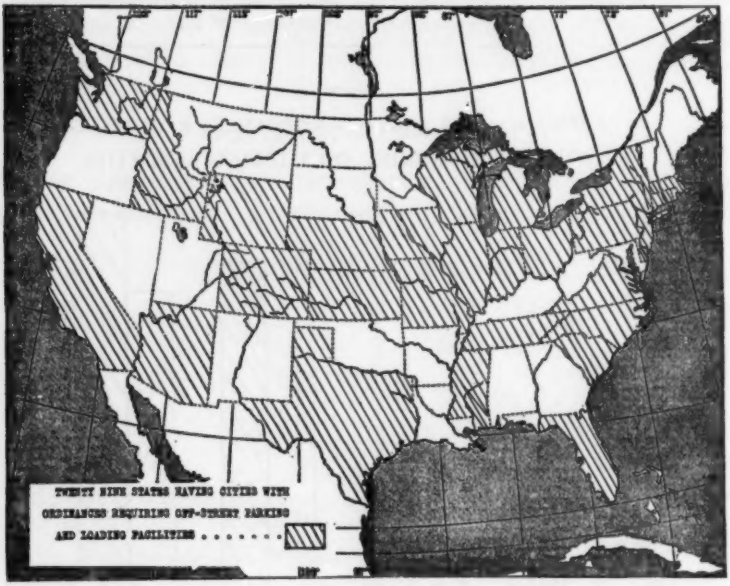


FIGURE 3

EARLY ORDINANCES

For cities furnishing information for this study, the first reported ordinance was in Columbus, Ohio, where in August, 1923, requirements were imposed which prescribed that off-street parking spaces be provided in connection with multiple-family dwellings. The first ordinance reported in the study which prescribed that parking spaces be provided in connection with buildings other than dwellings was in Fresno, California, where in March, 1939, an ordinance was passed which required hotels and hospitals to provide off-street parking spaces on the basis of one space per three guest rooms. The earliest ordinance reported, requiring commercial loading spaces off the street, was passed in Pueblo, Colorado, in 1931. This ordinance is discussed in a later section.

REQUIREMENTS BY TYPE OF BUILDING USE

Figure 4 shows the number of cities requiring parking for passenger cars in connection with the eleven types of buildings covered in the study. The most common ordinance involves provision of parking space in connection with multiple-family dwellings. Sixty of the 70 cities having ordinances reported provisions affecting this type of building. Other types of buildings have not been required to furnish off-street parking facilities in as many cities.

Figure 5 shows the number of cities requiring loading spaces for commercial vehicles in connection with the six types of commercial buildings studied. Retail stores, wholesale houses, and industrial buildings are required to furnish off-street loading facilities more frequently than are other types of commercial buildings.

A discussion of the ordinances in connection with various buildings is given below.

Single-family Dwellings

Among the 70 cities reporting ordinances which require the provision of off-street parking facilities, 18 specify them in connection with single-family dwellings.

Many cities in addition to those with zoning ordinances, have required the provision of off-street parking in connection with dwellings by writing into their traffic regulations a section which prohibits curb parking from 2:00 A.M. to 6:00 A.M.: "in order to allow street cleaning and snow removal," among many other good reasons. Urban traffic is at a minimum during these hours, and the majority of automobile users are in their homes. This provision, in effect, requires parking facilities off the street.

Multiple-family Dwellings

This type of dwelling must provide off-street parking spaces in 86 per cent of the cities which have zoning ordinances pertaining to parking. About two-thirds of these ordinances require off-street parking facilities on the basis of one parking space for each dwelling unit. One city requires that one and one-half parking spaces be pro-

vided for each dwelling unit, the purpose being to accommodate visitors and occasional families which possess more than one vehicle.

Very few ordinances state specifically whether such off-street facility shall be an enclosed garage or an open lot. One city requires that at least one-half of the off-street spaces shall be garages. This city requires that one parking "space" of 200 square feet be provided for each dwelling unit.

It is interesting to note that there is a close relation in a community between the zoning requirements and the motor vehicle registration. In the western part of the United States, where motor vehicle registration may be as high as one vehicle per two persons, the majority of the zoning ordinances require one parking space per dwelling unit. In the eastern part of the United States vehicle registration varies from one per four persons to one per six persons, and many zoning ordinances require only one space per two or three dwelling units. There are various requirements, such as the provision of two parking spaces for every three dwelling units, or three parking spaces for every four units, but in almost all cases studied, the requirements were less in the east than in the west.

Table II shows the various requirements of the sixty cities which have ordinances of this type.

Table II

PARKING REQUIREMENTS FOR MULTIPLE-FAMILY DWELLINGS

Requirements	*Number of Cities*	*Per Cent*
1½ parking spaces per 1 dwelling unit	1	1.7
1 parking space per 1 dwelling unit	37	61.5
1 parking space per 1 dwelling unit (except 1)	1	1.7
1½ parking spaces per 2 dwelling units	1	1.7
3 parking spaces per 4 dwelling units	3	5.0
2 parking spaces per 3 dwelling units	2	3.3
1 parking space per 2 dwelling units	13	21.7
1 parking space per 4 dwelling units	1	1.7
4 parking spaces per 5 dwelling units	1	1.7
Total Cities	60	100

Hotels

One-third of the cities having zoning ordinances relating to parking require that parking facilities be provided in connection with hotels. One New England town of 50,000 population requires that one parking space be provided for each guest room in the hotel. The most common requirement involves the provision of one space per three guest rooms. Many zoning ordinances simply specify "adequate" parking. Table III shows the various requirements for the twenty-two cities reporting ordinances affecting hotels.

Table III

PARKING REQUIREMENTS FOR HOTELS

Requirements	*Number of Cities*	*Per Cent*
1 parking space per 1 room	3	13.6
3 parking spaces per 4 rooms	1	4.6
1 parking space per 2 rooms	2	9.1
1 parking space per 3 rooms	6	27.2
1 parking space per 4 rooms	2	9.1
1 parking space per 10 rooms	1	4.6
1 parking space per 10 feet frontage	1	4.6
Parking space equal ground floor space	2	4.6
"Adequate"	4	18.1
Total Cities	22	100

Twenty per cent of the cities require hotels to provide off-street loading facilities for trucks. These requirements vary from a minimum of one loading space per 20,000 square feet of floor space used for storage or merchandising, to a maximum requirement of one loading space per 5,000 square feet of gross floor area. Several cities require loading spaces but do not have a definite space requirement. In these cities, each case is judged individually by a competent authority.

Hospitals

Eighteen per cent of the cities with zoning ordinances require hospitals to provide off-street parking space. One-third of these call for parking space on the basis of one vehicle per three guest rooms. One

mid-western city of 30,000 population treats hospitals in the same manner as multiple-family dwellings, requiring one parking space for each employee living in the hospital and one space for each two employees not living in the building. Other requirements are on the basis of floor area as shown in Table IV.

Table IV

PARKING REQUIREMEMENTS FOR HOSPITALS

Requirement	*Number of Cities*	*Per Cent*
1 parking space per 3 rooms	4	33
1 parking space per 1,000 square feet floor area	1	8.5
1 parking space per 200 square feet ground floor area	1	8.5
1 parking space per employee living in building; 1 per 2 employees not living in building	1	8.5
1 parking space per 300 square feet of sleeping space	1	8.5
"Adequate"	4	33
Total Cities	12	100

Hospitals must furnish off-street loading facilities for trucks on approximately the same basis as hotels. Of the thirteen cities requiring such facilities, ten are based on the floor area of the hospital. The remaining three cities allow each case to be judged individually by a competent authority.

Theaters

The idea of requiring theaters to provide parking space to accommodate the vehicles of its patrons is relatively new. Detroit, Michigan was the first city of the group studied to place such a requirement in its zoning ordinances. This was done in 1940 when the city adopted an ordinance requiring theaters to furnish one off-street parking space for each ten seats in the auditorium of the theater.

The requirements vary widely among the twenty-four cities with such ordinances—from one parking space per four seats to one per

twelve seats. Several cities require parking space to be furnished on the basis of floor space. At least two cities require that space provided for parking be equal to the total floor space of the building.

A summary of requirements for all cities which impose such an ordinance on theaters is given in Table V.

Table V

PARKING REQUIREMENTS FOR THEATERS

Requirement	*Number of Cities*	*Per Cent*
1 parking space per 4 seats	4	17.1
1 parking space per 5 seats	2	8.1
1 parking space per 6 seats	1	4.1
1 parking space per 8 seats	1	4.1
1 parking space per 10 seats	4	17.1
1 parking space per 12 seats	1	4.1
¾ parking space per 10 seats	1	4.1
Space equal to floor space	2	8.1
1 space per 200 sq. ft. floor area	2	8.1
1 space per 10 feet frontage	1	4.1
"Adequate"	5	21.0
Total Cities	24	100

A major portion of the operating period of a theater is normally conducted after the closing time of other business establishments located in the same section of the city. For this reason, it appears sound to allow theaters to take advantage of off-street parking facilities used during the day by other business establishments. Frequently these parking facilities are not in use during the early evening hours when recreation traffic in the city is at its peak, and demand for parking space by theater patrons is great.

Restaurants

Although only 17 per cent of the cities which zone for off-street parking require restaurants to furnish such space for patrons, many other cities are studying the possibility of adopting such ordinances.

Wichita, Kansas has adopted an ordinance which requires res-

taurants to provide one parking space for each 100 square feet of floor area devoted to dining purposes. This ordinance, however, does not affect restaurants located in buildings which occupy less than 1,000 square feet of lot area.

Los Angeles, California requires one parking space for each 1,000 square feet of floor space if the total floor area is 7,500 square feet or more.

Several cities require that parking space be equal to the total ground floor area of the restaurant, and at least one city requires the provision of one parking space for each four seats to be used by patrons of the restaurant. Frontage is also used as a basis for off-street requirements for restaurants.

Places of Public Assembly

About one-fourth of the cities with ordinances relating to off-street parking require that parking facilities be provided in connection with such places of public assembly as churches, auditoriums, bowling alleys, stadiums, and dance halls. Several cities require parking space for church-goers on the basis of the number of seats in the church. These requirements range from one space per five seats in a middle-sized, mid-western town to a requirement of one space per ten seats in such large cities as Los Angeles. Many cities exempt churches from these requirements in view of the fact that parking demands for other purposes are usually at a minimum when churches are in session.

Parking spaces for patrons of auditoriums are usually based on the number of seats in the auditorium, or on the floor area "if there are no seats or if the seats are removed for certain events." One space per ten seats is the most common requirement.

Bridgeport, Connecticut has placed parking requirements on two special types of facilities devoted to public entertainment which serve as focal points of traffic on certain occasions. All bowling alleys in this city of 200,000 are required to furnish off-street parking facilities on the basis of one and one-half spaces for each alley used for bowling. Dance halls are required to furnish parking facilities in the amount of three-fourths space for each 56 square feet of dance floor.

These figures take into account the fact that such establishments, especially dance halls, concentrate a large number of people in a relatively small area.

Retail Stores

Fourteen cities have zoning ordinances which require retail stores to provide off-street parking facilities for their customers. Of these cities, 3 require one parking space per 200 square feet of floor area. Two cities require parking space equal in area to the ground floor area, and the others have varying methods of determining the parking space required.

Generally retail stores are not required to furnish parking facilities, yet they head the list of all establishments in requirements by ordinances for off-street loading facilities. Thirty per cent of all cities which have zoning ordinances require retail stores to furnish adequate facilities for off-street loading and unloading of merchandise. The requirements of space are generally determined in one of three ways:

1. Gross floor area. The most common requirement calls for one commercial loading space per 20,000 square feet of floor area. One small city in the east requires one loading space per 5,000 square feet of gross floor area, and another in the same vicinity requires one loading space per 8,000 square feet of gross floor area.

2. Space between alley and rear of building. At least five cities require an open space between the rear of retail stores and an alley. The most common ordinance calls for 50 per cent of the alley frontage to be devoted to unloading space, such space to be a minimum of 14 feet in depth from the alley to the rear of the building.

3. "Reasonable" or "adequate" facilities. Five cities require off-street commercial loading facilities but do not specify a definite amount of such space to be provided. All these ordinances rely upon the word "reasonable" or "adequate," combined with the phrase "so as not to interfere with traffic." This type of ordinance allows the zoning board of appeals or other authority to pass on each case individually. While this system offers the advantage of allowing each case to be judged on its merits, it also presents the possibility of prejudice or favoritism.

Office Buildings

Fifteen cities require office buildings to provide off-street parking for employees and visitors. Ten of these base their requirements on floor space, the ordinances varying from a requirement of one space per 200 square feet of floor space, which one midwestern city and one southern city have adopted, to a smaller requirement of one parking space per 1,000 square feet of floor area. Los Angeles has adopted the latter requirement for buildings which have a total floor area of 7,500 square feet or more. As in the case of retail stores, several cities have ordinances that require each case to be judged individually.

It is interesting to note that none of the cities studied have ordinances which require off-street parking on the basis of the number of persons regularly employed in the building. Employees make up a definite part of the parking problem and any plan to alleviate the parking problem must take these persons into consideration if the plan is to be successful.

The requirements placed upon office buildings to provide adequate freight loading space off the street follow very closely the requirements imposed upon the retail stores, although only 17 cities control this matter.

Wholesale Houses and Industrial Buildings

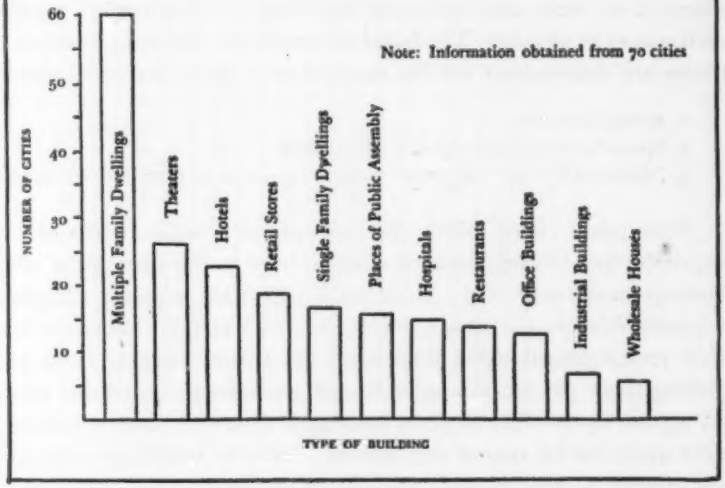
Industrial establishments and wholesale business houses do not generally create as great a demand for parking space as do retail stores and theaters which depend primarily upon a steady turnover of customers. Therefore, buildings devoted to industry and wholesale trade might logically receive less attention when the problem of providing off-street parking facilities arises. This is shown in Figure 4 which shows these two types of buildings to be affected by parking ordinances in 10 per cent and 11 per cent respectively of the cities with such ordinances.

Among cities requiring these buildings to furnish off-street parking, about one-fourth require space on the basis of floor area; about one-fourth allow each case to be judged individually with no definite standard; and one-half require spaces on the basis of the number of

regular employees in the establishment. The latter is a very sound basis, since the number of employees may vary widely between different industrial establishments having approximately the same floor area, the variations being caused by the type of industry. The more popular requirement calls for one parking space per two em-

FIGURE 4

CITIES REQUIRING OFF-STREET PARKING FACILITIES BY TYPE BUILDING



ployees. Various studies made throughout the country have revealed that the average occupancy of passenger vehicles is 1.7 passengers per vehicle; and these findings lead to justify this requirement.

Compared to requirements for other buildings, fewer cities require wholesale and industrial buildings to furnish parking space; though in many cases, buildings have long been required to furnish adequate off-street loading facilities. The earliest ordinance, based on replies received, dates back over fifteen years when the city of Pueblo, Colorado created an ordinance in June, 1931, requiring

wholesale houses and industrial buildings to provide off-street loading facilities. The ordinance reads as follows:

Loading Space: Every building erected on a lot abutting upon an alley shall provide a loading space for the use of commercial vehicles serving such buildings. Such loading space, unless adequately provided elsewhere on the lot, shall extend not less than 14 feet in depth back from the alley line along 50 per cent of the alley frontage, but in no case along less than 25 feet. In lieu of the foregoing requirement, a lot 50 feet or more in width may provide a loading space of not less than 10 feet in depth back from the alley line along the entire alley frontage.

Wholesale houses are required to furnish adequate loading spaces in 21 cities, and industrial buildings are required to furnish such spaces in 20 cities. The bases on which the necessary number of spaces are determined are the same as were given for retail stores:

1. Gross floor area
2. Space between alley and rear of building
3. "Reasonable" or "adequate" facilities so as not to interfere with traffic.

Four other cities follow the example of Pueblo, Colorado in requiring space to be provided along at least 50 per cent of the alley frontage in the rear of the building. Eight cities require "adequate or reasonable space so as not to interfere with traffic." Six cities base their requirements upon floor area, the values ranging from one loading space per 8,000 square feet of gross floor area to one space per 25,000 square feet of gross floor area. One city bases it requirement upon the lot area of the land on which the building is erected. A summary of this information is shown in Figure 5.

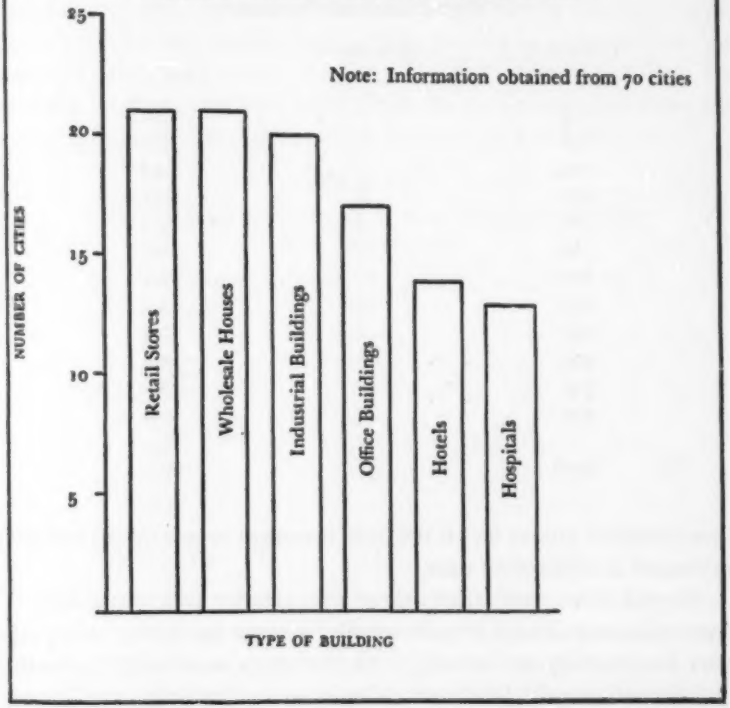
PROVISIONS MADE FOR BUILDINGS IN USE WHEN ORDINANCE ENACTED

Of the 70 cities reporting ordinances requiring off-street parking or loading space in connection with buildings, no city has passed an ordinance which is retroactive, affecting buildings in existence at the time the ordinance was passed.

Greenville, South Carolina, however, has approached this condition by setting a maximum period of eighteen years from the date

FIGURE 5

CITIES REQUIRING OFF-STREET COMMERCIAL LOADING FACILITIES BY TYPE BUILDING



of the ordinance during which buildings may continue to exist as non-conforming land use.

Many cities provide that if any building is "substantially" altered or repaired, the parking provisions must be complied with.

SPACE REQUIREMENTS FOR PASSENGER CARS

Of the 70 cities which have zoning ordinances, 31, or 44 per cent, submitted answers to the question: "How many square feet are required or are considered necessary to provide storage space for a

private car? The answers to this question varied over a wide range, as shown in Table VI.

Table VI

OFF-STREET AREA REQUIREMENTS OF CITIES TO STORE ONE PASSENGER VEHICLE

Number of Square Feet	*Number of Cities*	*Per Cent*
125	1	3.2
126	1	3.2
144	1	3.2
150	3	9.7
160	3	9.7
180	2	6.4
200	13	42.2
220	1	3.2
240	2	6.4
250	1	3.2
300	2	6.4
400	1	3.2
Total	31	100

Two hundred square feet is the most common requirement and this was found in cities of all sizes.

Several cities, particularly those with smaller area requirements, have ordinances which require smaller storage areas and "adequate space for entering and leaving." An ordinance so worded leaves the final decision to the land user, who in many cases does not have a clear understanding of the requirements of a vehicle. Since the land user is interested in reducing costs, he will, in all probability, allow an absolute minimum of space for such maneuvering, and when the public uses the facility it will require more space which will be obtained at the expense of storage space. Thus the capacity of the lot is decreased. Therefore, a better plan is to base the requirements on a definite number of square feet for each parking space. This overall figure should be sufficiently large to insure ample room for maneuvering. Requirements vary widely for different shaped areas and different parking arrangements.

LOCATION OF PARKING WITH RELATION TO BUILDING SERVED

Of the 70 cities which have zoning ordinances, 42, or 60 per cent, of these cities have definite restrictions concerning the location of the parking facility in relation to the building it serves. Of these cities, 24, or 57 per cent, require the parking facility to be located on the same parcel of land as the building. The remaining cities allow the parking facility to be located at distances up to 1500 feet from the building served. This information is shown in Table VII.

Table VII

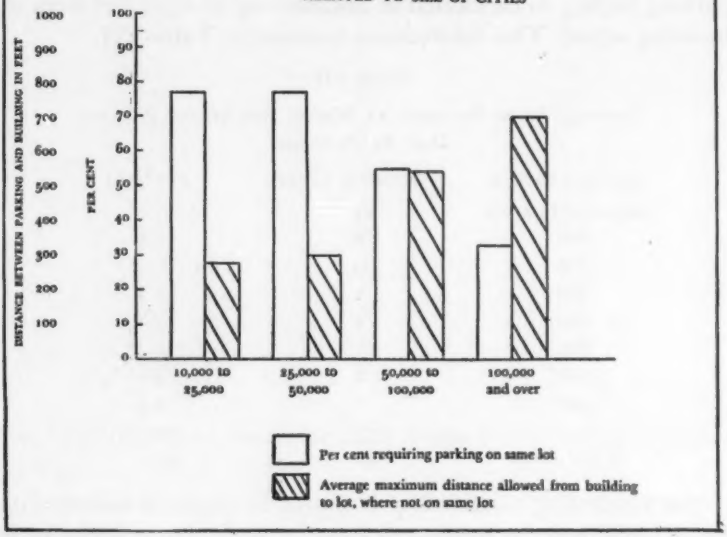
DISTANCE FROM BUILDING AT WHICH OFF-STREET PARKING MAY BE PROVIDED

Distance in Feet	*Number of Cities*	*Per Cent*
Same land parcel	24	57.0
200	2	4.8
300	9	21.4
400	1	2.4
600	2	4.8
800	1	2.4
1,100	2	4.8
1,500	1	2.4
Total cities	42	100

An interesting relationship is shown in Figure 6 between the size of cities and the maximum distance from the building to be served at which parking facilities may be located. In 77 per cent of the cities with populations from 10,000 to 25,000, the parking facility must be on the same lot as the building served. In the other cities in this population group, the maximum distance which the buildings and the parking facility may be separated is 300 feet—the average is 275 feet. Cities with populations from 25,000 to 50,000 again require in 77 per cent of the cases that the parking be on the same lot as the building served. All the other cities in this group provide that parking must be within 300 feet of the generator. Cities with populations from 50,000 to 100,000 require parking on the same land parcel in 55 per cent of the cases. One city allows parking to be provided within a radius of 1,000 feet, but the average of the

maximum distances allowed away from the building served is 540 feet. Thirty-three per cent of the cities with populations 100,000 and over require parking on the same parcel of land as the building to be

FIGURE 6
LOCATION OF PARKING
RELATED TO SIZE OF CITIES



accommodated. The maximum separation permitted is 1500 feet. The average of the maximum distances permitted between a building and its parking facility is 700 feet.

It is apparent from this study that the parking problem can be effectively tackled through zoning requirements. Sufficient experience has been gained to show that the requirement of off-street facilities by zoning provides a uniform, impartial, and effective means of improving terminal facilities in cities. It is believed that the advantages of zoning for parking will ultimately be recognized by all cities and that more and more of them will enact zoning ordinances which will assure adequate provision of off-street parking facilities to serve traffic loads generated by new businesses.

What Makes Drivers Act That Way?

BY HERBERT J. STACK, PH.D.

Doctor Stack is Director of the Center for Safety Education at New York University. During World War II he served as consultant to the War Department on driver training. Under his supervision the Center for Safety Education provided courses in safety education to army officers. He formerly was Director of the Safety Education Section of the National Conservation Bureau.

A MOTORIST was driving slowly along a narrow, slippery two-lane highway on a hilly terrain. The road was full of curves and steep grades, and had center lines prohibiting passing. Suddenly, without warning, a car tore by at high speed, rounding a curve, and sideswiped an approaching vehicle. The driver of one car was killed outright, three passengers rushed to the hospital with serious injuries, and two cars smashed almost beyond repair. *What makes drivers act that way?*

Following a college football game, the traffic from the stadium was extremely heavy. All the main highways were jammed with cars, with lines moving at a snail's pace and horns blowing impatiently. Traffic in the other direction was also heavy. Suddenly a big convertible loaded with six students pulled out of line, crossed the center marking, speeded down the left side of the highway, and crashed head-on into an approaching vehicle. In this crash five passengers were thrown from the cars and seriously injured, three with broken legs and arms and internal injuries. Following the crash, both cars, badly demolished, were thrown across the highway. State police and ambulances rushed to the scene, and the ensuing tangle tied up traffic for over an hour. One driver died that night in St. Vincent's Hospital and two passengers were crippled for life. Civil suits for damages in the courts following the accident were well over $75,000. *Why do drivers act that way?*

These are typical cases, taken from Motor Vehicle Department records. In an average year there are over a million others in our

country, some of a less serious nature, others far more costly. Many are the grim tragedies that day by day add to our toll on the highways, a toll that threatens to reach 30,000 for 1946.

What causes drivers to commit these unsafe acts that lead to costly mishaps? What are the reasons behind these unsafe practices? Why are the traffic courts in many of our cities crowded with motorists arrested as violators? What's wrong with the American driver?

In the first place, let us confine this discussion to the driver himself. We already know that upwards to 20 per cent of the accidents can be ascribed to faulty mechanical condition of the car, bad highway conditions, unfavorable weather, and other situations not *directly* under the control of the driver himself. But we also know that in an average year the driver was at fault in 69 per cent of the accidents; that is, he was committing some kind of violation or unsafe practice that contributed to the accident. These violations, listed in order in *Accident Facts,* are shown in the following table.

Table I

Violation	*Per Cent*
Exceeding speed limit	15
On wrong side of road	9
Under influence of alcohol	8
Exceeding safe speed limit	8
Not having right of way	7
Disregarding signs or signals	5
Other improper driving practices	17
Total	69*

In other words, the driver was committing some unsafe act or engaged in some faulty driving practice in 69 per cent of these accidents.

Going still further into the causes, why was the driver committing the unsafe act? We might summarize this briefly by saying:

1. He had faulty attitudes: he was reckless, careless, a chancetaker, impatient, a poor sport, discourteous.
2. He had inadequate skills: He was not a skilled driver, did not act safely

* In 69 per cent of fatal accidents, the driver was involved in some violation.

in emergencies, his reactions were slow, his vision was poor; in other words, he had poor aptitudes.

3. He was poorly informed: he did not know his weaknesses, he did not know the meanings of signs or state regulations; he lacked information.

Let us dig a little deeper into the contributing or underlying causes, for if we want to understand how accidents occur and find methods of making corrections, we should know more about these underlying causes. For example, let us take item 2 in the Table, "On wrong side of road." A driver gets on the wrong side of the road because of certain underlying, contributing causes. In a certain sense this violation is an effect; he gets on the wrong side of the road because something else is wrong. In the first accident described in this article, the driver deliberately drove on the wrong side in an attempt to pass on a curve. He either had bad practices or attitudes, or lacked information about sound driving practices. These faulty conditions in his personality contributed to the unsafe act that resulted in the tragedy.

Driving a car is a combination of two types of actions. The first are the automatic acts, such as shifting gears, avoiding obstacles and the like. The second, and by far the more important, are the acts involving problems and decisions; such as: Should I attempt to pass the car ahead? What does that octagonal sign mean? What does the driver ahead propose to do by that hand signal? Do I have the right of way at this intersection? These and dozens of other problems arise, several on each mile we travel. The decisions we make determine the kind of driver we are. The poor driver is obviously the one who follows unsafe practices. Sooner or later, by the law of averages, unsafe acts end in an accident. A driver who has too many narrow escapes—missing sideswipes by a few inches, getting into too many skids, making too many emergency stops—is "out looking for an accident." These are often symptoms that something is wrong. One driver had five emergency stops in a short 100-mile trip; another covered 3,000 miles without a single emergency stop. Which is most likely to have an accident?

What has research shown us about the attitudes, aptitudes, skills and other factors in the personality of drivers? During the past year the writer has been collecting and analyzing the findings of thirty-

five research studies carried on in the United States and foreign countries, all concerned with the personality of the driver. It is not possible in this article to discuss these studies at length; we can only point out the most significant findings.

Reaction Time

Some of the basic studies on reaction were made by De Silva at Harvard and Lauer at Iowa State. De Silva showed that there was some difference in the reaction time of good[1] and poor drivers. Fletcher of the California Motor Vehicle Department found that in simple braking time, good drivers average .37 seconds and poor .39. In complex reactions, where the individual responds to a series of lights, the difference is more significant, good drivers scoring .47 seconds and poor .53. Brody at New York University corroborated the Fletcher findings and pointed out that there was little difference between the reactions of accident-prone and accident-free drivers. A German psychologist, Messbach, reported at Prague that reaction time might vary from 1.4 to 2 without any indication of carelessness, while another scientist, Ponzo, reported that recovery time is quite as important as reaction time. Lahy showed, as might naturally be expected, that reaction time is markedly affected by fatigue. It appears, therefore, that simple reaction time is not a sound criterion for judging drivers. Making the proper choice in reaction is a far more valuable index.

Blood Pressure

Brody also pointed out in his study the prevalence of low blood pressure among accident-repeaters. In 77 per cent of this group, the systolic blood pressure was low. Bingham also found that high blood pressure was common among motormen accident-repeaters. There are undoubtedly many cases of accidents in which the car goes off the road and a bad crash results which are caused by heart attacks or cerebral hemorrhage. Persons with serious heart diseases and

[1] A *good* driver may be defined as one who has driven for several years without an accident; a *poor* driver is one who has had several accidents within the year.—Editors.

unusually high blood pressure should let someone else in the family do the driving. This would apply also to persons who have epilepsy or spastic paralysis.

Vision

Vision plays a highly important role in driving. The fact that state license departments have been giving the Snellen Visual Acuity Test for years shows the importance of this. Fletcher showed that more than twice as many poor drivers as good failed the State Visual Acuity tests. He showed also that among seventy drivers arrested for "cutting in," more than one half had subnormal acuity, and that 24 per cent of the poor drivers as compared with 3.5 per cent of the good failed the glare test. In addition, 128 of the 174 fatal accidents in which these drivers were involved were found to have occurred at night. A recent Connecticut study shows that there are more than twice as many accidents at night per vehicle mile of travel as during the day. Undoubtedly poor vision and low visibility are among the conditions which lead to the higher percentage of night accidents.

Other studies of vision show the following:

a. Peripheral vision is important when the total field of vision is restricted to 20/50 degrees (Fletcher).
b. Berens contends that many narrow escapes, as well as accidents, resulting from "cutting in too sharply" and "passing with insufficient distance," can be attributed to faulty judgment with regard to distances and speeds.
c. One-eyed drivers who lack binocular vision and depth perception are not considered good risks, but not too much is known about their driving records.
d. Lack of color vision (ability to distinguish red from green) has been found to be rare as a cause of accidents (De Silva).

Hearing

There is little evidence to show that hard-of-hearing drivers, provided they are aware of their weakness, have any poorer driving record than normals. On the contrary, the Pennsylvania Motor Vehicle Department studies indicate that the record for the deaf is better than that of the average driver. It is felt that deaf drivers who know

about their impairment drive more cautiously and depend more upon their eyesight and skills to keep from being involved in accidents.

Intoxication

Many studies have been conducted to show the effect of alcohol on drivers. Vernon reported a study which showed "that alcohol tends to make drivers drive faster, without becoming aware of the acceleration." Studies were conducted at Northwestern University working in cooperation with the Evanston Illinois Police Department. Alcohol breath tests were made of 1,750 drivers selected at random. These were compared with tests of 270 drivers brought to Evanston hospitals after being involved in accidents. Of the unselected drivers, 12 per cent showed alcohol in the blood, while 47 per cent of the hospital cases showed alcohol.

Lack of Driving Skills

It has been clearly demonstrated that inadequate skills, lack of resourcefulness in emergencies, and faulty practices contribute to a large percentage of accidents. Many drivers have little or no sound instruction before they secure licenses. Studies conducted by the A.A.A. in Cleveland show the superiority of the trained high school driver over the untrained. In addition, the experience of the Army and that of commercial fleets shows the value of proper training.

The work that is now going on in high schools should have great value in improving the practices of younger drivers. Furthermore, the training that is being given at Army, Navy, and Veterans Hospitals to amputee and paraplegic disabled should be most helpful in maintaining the favorable accident record that the orthopedically disabled have established in the past.

THE PLACE OF KNOWLEDGE AND INTELLIGENCE

We often refer to motorists who irritate us as those "dumb" or "stupid" drivers. But there is little evidence to show a correlation of intelligence with safe driving. It was reported in a Prague experi-

ment that persons with a score of under 60 in Army Alpha tended to be poor drivers. Borderline cases or the feebleminded would belong in this group. On the other hand, persons with a high I.Q. are not superior drivers; in fact, some studies tend to show that they are less expert than those with average intelligence.

But it doesn't take superior intelligence to know the traffic regulations, rules of the road, and vehicle maintenance. Yet these are important, for many accidents can be directly traced to lack of information.

While state license examinations generally include a so-called "mental test," the lack of time for giving state tests often precludes the use of a thorough information test, for example, a standard test of 75 to 100 items.

WHAT ABOUT DRIVERS' ATTITUDES?

A great psychologist once said that our intellect was like a speck on the sea of our emotions. We are guided in so many of our life activities by our emotions and attitudes, rather than by our knowledge and intelligence. All of the research studies on the actions of drivers seem to point in this direction. There is every reason to believe that a large share of all accidents are due not to a lack of skill or a lack of knowledge, but rather to faulty attitudes. We often describe drivers as reckless, foolhardy, chancetakers, discourteous, "showoffs," "speed maniacs," "cowboys," "day dreamers," "road hogs," and the like. Some of these are the emotionally unstable; others would include the neurotics and the mentally-diseased that Selling reported in his Detroit study of traffic offenders. Extremes of anger, impatience, anxiety, timidity, and bravado also contribute to accidents. It is not necessary to point out examples of each of these; all of us can recall instances within our own experience on the highway.

In a very large percentage of the unsafe acts mentioned earlier in this article, the underlying cause of the accident was one or more of these faulty attitudes. Failure to follow regulations, "jumping" traffic lights, pulling out of line, and driving at excessive speed are not so much due to lack of information as they are to bad attitudes. And here is where enforcement comes in. If drivers cannot learn

proper regard for regulations and practices by ordinary methods, they must learn the hard way—through arrest, fines, and revocations or suspensions of licenses.

Siebrecht in his doctor's thesis at New York University was one of the first to study the driving attitudes of younger drivers. His Attitude Scales tend to show improvement in attitudes as students complete driver-training programs in schools. It appears that while attitudes may not be taught, they may most certainly be *caught*.

Referring again to Table I, we note that intoxication was one of the leading causes of accidents. We discussed certain psychophysical effects of alcohol. Why do so many drivers repeatedly take chances in driving after they have been drinking? Is it a lack of information or conviction about the effects of alcohol on their driving? Certainly a great deal has been done to publicize the effects of alcohol and the resulting tragedies on our highways. But alcohol has a double-barreled effect. It not only impairs the psychophysical functions; it also affects the attitudes. Caution, courtesy, respect for the rights of others, and for traffic regulations—these and the other good attitudes are thrown to the winds. Only too often bad attitudes—recklessness, bravado, discourtesy, and a flouting of the regulations—take their place.

Accident-Proneness

This subject can be discussed only briefly in this article; it is a highly important one and merits an entire article in itself. It has been known for some time that certain drivers tend to be accident-repeaters. A Connecticut study, for example, showed that 4 per cent of the drivers were responsible for 36 per cent of all accidents. There are many drivers who have from 4 to 8 accidents a year, while others covering the same mileage will go five to ten years without a reportable accident. As a matter of comparison, there are thirteen drivers in New Jersey who have orthopedic disabilities and are driving cars with special controls who in seven years have driven a total of over 500,000 miles with only one reportable accident. The causes of accident-proneness are complex and variable. Many of the underlying causes have been discussed previously in this article. Some lie in the realm of the physiological; others in the psychological.

They have sometimes been known as the "X" factors, because they are so variable and are for the most part unknown.

Dr. Dunbar of the Columbia University Medical Center, following several years of research in this field, found that many cases of accident-repeaters could be traced to psychiatric difficulties. She found that restless, happy-go-lucky people and those who are good mixers, fond of sports, gambling, machinery, and going places in a hurry, tend to be accident-prone.

We are finding that accident-proneness is a factor in the personality of individuals which may contribute to repeated accidents in industry, in the home, in school, or in traffic. Four doctoral studies are now in progress at the New York University Center for Safety Education which should throw some light on this complex problem.

CONCLUSIONS

A large percentage of our highway accidents are caused by unsafe acts on the part of drivers. Behind these unsafe acts are a large number of contributory causes or conditions that are part of the personality of the driver himself. These contributory causes may be divided roughly into three areas: (1) faulty attitudes, (2) lack of skills and psychophysical aptitudes, and (3) lack of information and intelligence.

In a given accident, several of the contributory causes may combine to result in the unsafe act which is the direct cause of the accident. Most of these contributory causes are not apparent to the officer who investigates the accident. They may be complex in origin, but they can be located and measured. As Thorndike has said, "Anything that exists, exists in some amount, anything that exists in some amount can be measured."

The implications of this are immediately apparent. They suggest the strengthening of our education, engineering, and enforcement attack on accidents. They recommend the improvement of state requirements for the driver's license and the work of the courts. There are still many states where the driver's license is as easy to secure as a hunting or fishing license, and at far less cost.

Faulty attitudes can be improved by education and strict en-

forcement. Faulty skills and psychophysical aptitudes can be located, and in many cases remedied or compensated for. Lack of information can be taken care of by a continuous program of public education through the newspapers, radio, motion pictures, and other media.

Much can be done for the younger drivers in our high schools. Here is the place to train the drivers of the future. Yet it is a sad commentary on the resourcefulness of our high schools to come to grips with one of the real problems of youth to find that youngsters can go through a great majority of the schools of our country and learn little or nothing about traffic safety and their responsibilities as drivers on our streets and highways. The high school is an ideal place to improve attitudes, to diagnose psychophysical difficulties, to learn skills, and to send out students who are well informed. Some schools are doing a superior job, but the great majority are doing but little.

All of these implications involve a more scientific and technical approach to the problem. It is no easy task and many difficulties must be faced. But much can be done by strengthening the work of all agencies that are in any way concerned with traffic safety.

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Seven Steps to Safety

BY INSPECTOR LAWRENCE HINCE

Inspector Hince is in charge of training activities of the Federal Bureau of Investigation, Washington, D. C. He directs the in-service training for local police departments and the National Police Academy. He coordinates the training work of field offices of the FBI with local police officials.

WHEN the Federal Bureau of Investigation opened the doors of the National Academy at Washington to the police executives of the Nation in July, 1935, there was no thought in the minds of FBI officials that out of this institution would come a concept of police administration which now gives promise of a new era in traffic control. It was expected that the Academy would serve as a vehicle to carry the best principles of enforcement to police officials so that they, in turn, might teach them to brother officers at home. To date, 1,381 officers have done just that, and FBI teachings in the whole broad field of enforcement have been made available to more than 100,000 law enforcement officers through the local, county, and state police schools sponsored by the FBI.

Because the Bureau's operations are principally in the fields of major crime and national security, it was expected that such subjects as "Criminal Investigation" would predominate in the National Academy curriculum. It was soon found, however, that important as criminal investigation work is, the problem of traffic law enforcement was, to the local police agency, a problem of such magnitude as to deserve the application of the best possible techniques in training and in operations. For every person murdered, three die needlessly in traffic accidents. For every person inconvenienced by criminal acts, hundreds are hindered and delayed by traffic congestion. The annual economic loss through traffic accidents alone has been estimated at more than one billion dollars, and the loss through congestion magnifies the problem until it is way out of proportion. It is well to look at an object with a magnifying glass in order to identify its details. But it is unwise to judge the size of the object through such a glass.

As every student of the traffic problem knows the accident death rate has actually decreased. This rate, determined on the basis of miles traveled, is a reliable index of the accident problem since it is based on exposure to hazards. From 1925 to 1945 the mileage death rate dropped 40%. During the past five years one person has been killed for every nine million vehicle miles of travel. As every student of the problem also knows, these facts are never emphasized and almost never mentioned in safety discussions. Is this a dark picture? One person killed in 9,000,000 miles of travel over a road system having usually from one to twelve grade intersections per mile and over which thousands of vehicles move every hour through pedestrian traffic—vehicles driven by people of various ages and abilities ranging in driving experience from beginner to the professional and in mentality from moron to intellectual. Consider that these vehicles are of various sizes, classes, and types; that they are capable of, and are traveling at, speeds ranging from two to eighty miles per hour; that they are in every state of repair; that they start, stop, turn, and weave through pedestrians and vehicles according to the desires of the average driver. They are operated at all hours of the day and night by persons in all types of physical condition through sleet, rain and fog, and over ice, snow, mud and sand. Their only contacts with the road are four small patches of rubber the size of your palm. Is it any wonder that one person should be killed in 9,000,000 miles of vehicle travel?

Is it surprising that in traveling a distance 360 times around the world one person should be killed in a traffic accident? We have in the United States 40,000,000 automobile drivers. Each year they travel from 200 billion to 300 billion vehicle miles, from 4,000 to 7,500 miles per driver. Is it strange to believe that at the rate of 7,500 miles driving per year the average American motorist would kill only one person in the equivalent of 1,200 years of driving on American highways?

On the basis of miles traveled and all deaths involved, the motor vehicle is about three times as safe to the public as a whole as transport planes and more than forty times safer than passenger trains, this in spite of the fact that trains travel on rails and planes on radio-controlled routes, and that engineers and pilots who are highly

skilled operate under strict regulation and control. Certainly this is not a dark picture for the motor vehicle. It is a surprisingly bright picture and one which has not been emphasized in its true light, in the usual interpretation of statistics, as one of the very safest means of transportation.

Surely the motoring public has accepted its responsibility to drive safely, otherwise such low rates could not have resulted. This is a credit to all who have been active in teaching them to drive safely and in providing safer and better roadways. In particular, it is a credit to the police of our Nation who have worked so diligently to obtain the present high degree of compliance with reasonable traffic regulations.

It is not my intent to minimize the seriousness of the traffic accident problem. Rather, the purpose of this brief discussion has been to show that the automobile has provided us with a relatively safe and highly convenient, necessary means of transportation, and that the motoring public has not done a "bad job" in assuming the responsibility of operating it safely. All are agreed that when a problem reaches such magnitude that 25,000 to 40,000 people are killed annually, no effort should be spared to overcome it. Although the accident death rate during the years has steadily decreased, there remains much to be done. Even if it were reduced to one-half or one-third of the present rate, there would be no justifiable reason for putting aside the efforts of public agencies to further reduce the number killed and injured. As long as the life of any citizen is placed in jeopardy through the operation of automobiles, a great responsibility rests upon all the public agencies charged with the duty of protecting life and property.

The administrative traffic problems of police in the large metropolitan cities differ from those of the average city. Personnel strength is, of course, much greater in the large city. Squads may be shifted from one assignment to another or from one section of the city to another. A generous allocation of men may be made available for an important problem as the need arises. In small departments, however, one officer may be required to handle not only routine matters but emergencies. The assignment and distribution of manpower, although based on the same facts, differ widely. In large cities traffic

engineering departments are established to handle engineering matters related to traffic control. Provision has been made for traffic safety education in the schools and for the public. In the smaller city these responsibilities will rest largely on the police department. Because a vast majority of all city police departments have these problems, this discussion will be directed toward the traffic administrative problems of the smaller departments.

The experience of the past two decades shows that the accident rate can be reduced. Continued reductions will come from intelligent police administration and enforcement of traffic laws; from the education of motorists and pedestrians; and from the improvement of engineering in the road and vehicle. The degree of safety achieved will be determined largely by the extent to which each of the agencies responsible for the above factors performs its functions. The cooperation and united effort of all are absolutely necessary.

In the average city most of these jobs must be performed by the police department. Although it is recognized that traffic engineering and education are basically not police functions, the average department with little additional training and effort can provide the basic needs in these fields. What then are the steps in achieving a sound traffic control program for the average police department?

1. GET THE FACTS

Efficient traffic police administration must be based on facts. Without facts to guide the work of the police department, manpower may be wasted on unessential or nonproductive activities. An officer may be permitted to patrol where and when he chooses with little or no plan for working the high accident areas. Because of isolated but influential complaints officers may be assigned to direct traffic at intersections where few or no accidents occur. Signs, signals and other traffic control devices may be installed where they are not needed and other locations justifying their use may be left unprotected. Efforts to teach the public how to prevent accidents might be misdirected because the causes of accidents are not known.

The facts which the Chief of Police or the administrative officer must know to direct an efficient traffic control program are: (1) accident facts, (2) arrests and violation data, and (3) traffic flow data.

Accident Facts

Certainly every department should have a record of the number of people killed, the number injured and the number of accidents which occur. These records are necessary to determine the seriousness of the problem; how it compares with that of other cities; whether it is getting better or worse. Commanding officers should know these facts for the area they supervise. Beat officers should know how many people have been killed or injured on the streets in their beats; the number of pedestrians involved; and the number of accidents at each problem intersection. Only when such facts are available and known by all officers responsible for enforcement in a particular area, will their efforts be most productive. An officer who arrests a motorist or issues a citation for speeding in a high accident area should, for example, be able to tell the motorist how many accidents have occurred in that area because of excessive speed. Few motorists would criticize a police department for enforcing such laws if at the time of the arrest they were advised of the number of accidents which that particular violation had caused during the year.

Accident data of this type are particularly valuable to police departments in several other ways. Many departments keep an accurate record of all accidents occurring at each intersection or other hazardous locations in the city. This information is consolidated into what is called a "worst corner" list. The twenty-five most hazardous locations are listed in order of their accident frequencies, with the location having the most number of accidents first and others arranged according to their accident experience. It is obvious that this list in itself would serve as a valuable guide in the distribution of manpower.

Furthermore, the list is of value in considering requests for control devices or greater personnel assignments. Reference to the list may suggest whether the request is justified. Certainly it would be helpful in showing why many requests are not justified on the basis of accident experience.

Knowing the number of accidents and the number of people killed and injured is not enough. The distribution according to

location, the causes, the hour and day of occurrence and similar data are also essential for good traffic administration.

Arrests and Violations

Arrest and violation data are necessary to determine a plan of action consistent with the accident frequency. A record of the violations in accidents is necessary to determine which violations contribute most frequently to accidents, and which should, therefore, receive the most attention by enforcement officers. If it is known that failure to observe stop signs and traffic signals is contributing to a large number of accidents, rigid enforcement should supplement such control devices.

An accurate record of arrests is also necessary to determine if enforcement attention is being directed toward the violations most frequently causing accidents; and further to determine if enforcement is being applied in the high accident locations during the hours of greatest frequency. A comparison of arrests and violations shows the commanding officer how to revise his enforcement effort to achieve better efficiency within manpower limits.

Traffic Flow Data

One source of valuable data used very little by police departments is that pertaining to the characteristics of traffic flow. Traffic volumes, speed and observance data are of particular value to every commanding officer who has responsibility for traffic control. Vehicle volumes together with the turning movements, conflict points and pedestrian data are of primary importance in the study of any high accident location. It is frequently possible with these data to immediately determine methods of eliminating a particularly bad accident problem.

Since police are solely responsible for the enforcement of all control devices and regulations, frequent surveys should be conducted to determine the degree to which they are observed. An increase in violations indicates that additional enforcement is required. If speed limits are not being observed more attention should be given to

speeding. When it is found that observance is satisfactory, enforcement effort may be gradually shifted, but careful study should follow to be sure that accidents do not increase.

Utilizing all of the factual data obtainable will materially assist all police departments in bettering their traffic control program.

2. ADOPT SOUND PRINCIPLES OF ORGANIZATION

A careful study of police organizations has revealed that traffic control constitutes from fifty to seventy per cent of the police problem. On this basis it appears that a proportionate amount of police effort should be devoted to traffic work. An analysis of police practices and procedures revealed something quite different. Established long before the advent of the automobile, police departments were organized on a geographical basis, with authority to protect life, limb, and property going hand in hand with responsibility for such protection over a given area. Responsibility was for the safety of citizens in a definite space of land. This land was divided and subdivided into districts and beats. In the smallest division, the beat, the patrolman was charged with responsibility for all action necessary to protect citizens. This was good, sound organization. But with the coming of the motor vehicle and the multitude of problems it created, many police chiefs succumbed to the insidious temptations of overspecialization. Officers were selected for special traffic duty and given specialized assignments at street intersections to direct and control traffic movement. This was intelligent specialization. But the next step was a step toward the hopeless confusion of overspecialization. It was the creation of new and separate Traffic Divisions, exercising line authority over a group of uniformed "Traffic Officers" who now duplicate the activities of regular beat patrolmen and whose very presence on the streets removes from the regular uniformed force all responsibility for traffic conditions.

In one eastern city, two police officers stand at any of the busy downtown intersections from 8:00 A.M. to 4:00 P.M. each day. Officer #1 is a regular patrolman from Station #1. He patrols a short beat in the area. He was trained in the local Police Academy, the curriculum of which contains one day of traffic training in a three-

months' program. At intervals, this officer is visited by a Station # 1 Supervising Sergeant and less frequently is visited by a Station # 1 Lieutenant and by the Station # 1 Captain. The officer has little more interest in and knowledge of the traffic problem than has the average intelligent citizen on his beat. He was not trained in traffic control. He has never been assigned to specialized traffic duty. He regards traffic control as the exclusive property of the Traffic Division. He pays scant attention to parking violations, ignores speeding, and when accidents occur, he sends for the "Traffic Division." A car passing him at forty miles an hour in a crowded street would likely not excite his interest unless the occupants were fighting or shooting. Criminal violations are his interest and he handles them faithfully and efficiently.

Officer #2 is a "Traffic Officer." He is assigned to the "Traffic Division," a headquarters unit having city-wide authority and responsibility. He, too, is a graduate of the local Police Academy but, upon assignment to the "Traffic Division," he received a special training course in traffic control. From 8:00 A.M. to 9:15 A.M. and from noon until 1:00 P.M., he stands in the intersection and when the signal light changes, he blows his whistle. He watches to see that pedestrians do not cross against the light and does a satisfactory job of traffic direction. At 9:15 A.M. and at 2:00 P.M., he returns to the street corner and chats with passers-by until the day's work is completed. He is visited at intervals by a Traffic Division Sergeant and, at times, by a Traffic Division Lieutenant, Captain, and Inspector in Charge. He will handle minor disturbances, if forced to do so, but with reluctance. His interest is in traffic safety. A car speeding past his post at forty miles an hour will excite him greatly, but a fight taking place within a car traveling at fifteen miles an hour will not ordinarily spur him to action. He does a good traffic job, but that is all.

The duplication in area coverage at the patrolman level in this situation does not stop there. It extends up and through the duplicating sergeants, lieutenants, and captains, into the fields of supervision, executive direction and administration. But worst of all is not the duplication in officers present on the street, for if all were interested and active in traffic law enforcement the added personnel

might be productive. What is disheartening is the fact that the assumption of full authority and responsibility by the specialized Traffic Division has robbed the area commander and his men of all interest in traffic conditions and has resulted in a loss to the community of the valuable services which the regular uniformed force render in the interest of traffic safety. The Captain of Station #1 probably does not even consider the trend of traffic conditions in his precinct. He is not held accountable by the Chief of Police for safety on the streets. He probably cannot tell you the number of traffic fatalities in his precinct for the current year. He has no spot maps of accidents in his area; no plan of action for "worst corner" locations. In short, he has no incentive to wield the powerful weapon of regular uniformed personnel in the fight for safety.

A glaring example of inactivity on the part of regular uniformed forces in departments which suffer from this evil of overspecialization is found in one city where, in one entire year, the number of arrests for traffic violations made by non-Traffic Division personnel averaged one per officer per year. This is in sharp contrast with the experience of Milwaukee, Wisconsin, a city in which overspecialization is not permitted and in which the officer nearest to a traffic accident must investigate it. There, in a sample year, the record shows that forty-five per cent of the arrests for moving traffic violations and fifty-one per cent of arrests for parking violations were made by regular beat patrolmen. And that city ranked first in freedom from fatalities in thirteen years out of a fifteen year period among cities of its population class.

This overspecialization reduces the effectiveness of the department in another way. All of us know the temptation to speed when in a hurry, the urge to ignore the red light and the stop sign. But when we feel that urge, our first reaction is to look around for the "traffic cop." With the known apathy of the regular patrolman to traffic violations, the citizen is not deterred by his presence. It is only the Traffic Division or "Safety Car" that deters. So the effect of the regular patrol is largely lost. This situation is highlighted in an increasing number of communities where traffic officers are even dressed in uniforms of a color different from those of the regular force.

Overspecialization has another decadent effect on police departments. It creates cliques. The pressures upon police chiefs have included the demand that all the youngest and most intelligent officers be assigned to the Traffic Division. In one city, for example, the head of the Traffic Department (here a division of a police department has taken on the full title of department) regularly visits the Recruit School at its conclusion and selects the recruits with the best prospects and assigns them to traffic work. Other officers are made to feel that they are rejects. They develop a natural cynicism toward traffic officers and, by association, toward traffic problems. These attitudes make for a lack of cooperation among large groups of officers in the same department.

Overspecialization has led to development of special squads of motorized police designated for speed control principally. In some cities these details have been given specific violation quotas to meet. In other words, each man has a certain number of arrests which he must make daily. Little supervision of these men is possible since they operate throughout the city, out of a headquarters division, and are not subject to the supervision of local area commanders. As a result, it is an open secret in at least two cities that many of these officers make a few arrests in the early morning, go home until near the end of the shift, fill their quotas on the way to headquarters, and report in for the day. This laxity in supervision and this quota principle have vicious effects in addition to those immediately obvious. With a quota to fill near the end of the day and limited time to fill it, unjustified arrests must be made. Such practices are repulsive to the very justice which law enforcement organizations are pledged to uphold.

Here are four serious violations of the fundamental principles of area organization for police control. First, duplication of area coverage through overspecialization, resulting in the independent and uncoordinated assignment of personnel. Second, a wastage in manpower through overspecialization, which requires two men where one could as well be trained to do the jobs of both. Third, the removal from the area commander of authority and responsibility for handling problems arising within the area. Fourth, the vesting of authority and responsibility for street problems of traffic control in

a headquarters officer—the Traffic Division head—when headquarters' activities should be limited essentially to staff functions.

Overspecialization has gone much further. Regulations have been promulgated in some departments requiring the referral of all accidents to special "Accident Investigation Squads." Thus, there is a specialization within specialization. A lieutenant in a midwestern police department, attending a specialized course of training in traffic control, was taken on a field trip to observe a specialized system in operation. On arrival, he was assigned to an Accident Investigation Squad car having a crew of two special traffic officers. His description of accident investigative methods is revealing. While cruising in an assigned patrol area, a radio call was received, to investigate an accident in another patrol area to which, apparently, no specialized crew was assigned. Off they went, careening through the city at high speed for a distance of some miles. Arriving at the scene of a minor accident, the officer being trained noted that two regular police officers were standing idly at the scene awaiting their arrival. The student inquired as to why they had not handled the accident. He was informed, laughingly, that it would have been a violation of departmental regulations, since such matters are assigned exclusively to "the brains."

An associate editor of a southern newspaper cited an experience while riding to work on a trolley car filled with workers. The car collided with an automobile at an intersection, resulting in no damage to the trolley car and minor damage to the automobile. No one was injured. The editor stated that the trolley car was held up at that point for twenty minutes with sixty passengers aboard, a total time loss of twenty man hours, awaiting the arrival of an "Accident Investigation Squad" car while, during the entire interval, two beat patrolman stood on the corner and calmly observed the passengers' discomfort.

This overspecialization was given a humorous twist by a Deputy Chief of Police in a west coast city. He pointed out that if he encountered a minor property damage accident while driving his car on duty, he, although a Deputy Chief, was prohibited by departmental regulation from handling the investigation.

These incidents are but examples of the conditions found to be generally existent in those departments which have been victims of

overspecialization. Police Chiefs should not be blamed for these inefficient methods. They have adopted them reluctantly and after having been subjected to various forms of pressure from outside their organizations. Pressure groups have propagandized citizens by slogans, have urged not only the establishment but the enlargement of special "Traffic Divisions" without realizing the debilitating effect of such action on the department. Some organizations have used their influence to encourage specialization because of the false conclusion that the establishment of a specialized division would result in more attention being given to traffic control, but without realizing that overspecialization is a drug and that sooner or later it produces no effect; then additional doses are called for in the form of increased assignments of personnel to the specialized division. Sooner or later there is no more of the drug available and progress in traffic control comes to a standstill.

These pressures have been aided and abetted by a few self-seeking promoters who have tried to glorify their personal importance and perpetuate their sinecures by defying the traffic specialists. Their doctrine has been "The average officer is too dumb to do traffic work." They have set up institutions to foster specialized activity and to act as sounding boards for propaganda. When a Police Chief has refused to come to heel at their call, he has been subjected to a barrage of pressure action. The Chief of Police in one city reported that one local organization consistently threatened that it would put pressure on the city council to separate traffic control from the police department unless its every demand for traffic specialization was met.

All of us have seen pressure placed upon police executives to assign high percentages of police personnel and equipment to traffic enforcement work. Initially, there was a need for a generous allocation to traffic enforcement work, but we must now be careful to see that emphasis placed on this phase of law enforcement does not extend unnecessarily. It is the responsibility of the police executive to make allocations on the basis of the facts existing in his community and not as a result of an outsider's preconceived notion of what should be done in his community without a consideration of all local factors. Survey reports frequently bear all the earmarks of a mimeographed report which might as well apply to any other community in the country without a careful analysis of the problems of

the community under examination. The use of such reports to intimidate the police executive and to bring pressure to bear upon him is inimical to the best interests of the community and is definitely prejudicial to the law enforcement organization.

Our traffic problems of accidents and congestion cannot be cured by enforcement alone. Engineering and educational agencies have vital parts to play in applying remedial measures. To enforcement, however, goes the major task of reducing the accident problem. It is recognized by all experts in the safety field that, although the automobile and the roadway contribute to the accident problem, the overwhelming number of accidents are traceable directly to faults of the driver. The problem, then, is one of producing safe driving on the part of every motorist. Educators can contribute much in the way of training drivers, particularly youthful drivers, through the agency of the school systems. But the greatest educational force is the presence on the streets and highways of well-trained police officers, supplemented by the deterrent effect of efficiently conducted accident investigations. When the average American motorist becomes convinced that every police officer whom he sees will enforce strictly but fairly the traffic laws and ordinances, and when the motorist becomes convinced that any accident in which he is involved will be thoroughly and efficiently investigated, then the deterrent effect of such law enforcement measures will produce a marked improvement in safe driving. This objective cannot be attained by the efforts of a small percentage of the police department and cannot be reached by the present traffic administration policies which assign from ten to twenty-five per cent of the police department's personnel strength exclusive responsibility for the handling of the traffic problem which is admitted to be from fifty to seventy per cent of the law enforcement problem in American cities.

The answer to the enforcement problem has been found by serious students engaged in an unprejudiced study of the facts. It is this—no real progress in traffic law enforcement can be made until law enforcement organizations return to basic principles of organization and administration. Among these are:

1. Area Commanders (Precinct Captains, Division Commanders, Captains of Uniformed Forces) must be given complete responsibility for

traffic control of crime. With responsibility must go authority to command all uniformed personnel in their areas.

2. Headquarters Staffs in Traffic Control must revert to strictly staff functions of planning, maintaining records, training, supervision of accident reports, advisory functions, departmental safety activities, inspections of departmental equipment and devices, and specialized handling of serious traffic accidents.
3. All line officers in uniform must be under the direct command of the Area Commander, so that he may coordinate traffic details with regular beat assignments.
4. All uniformed men must be trained to do all the jobs which normally arise in the course of duty.

3. PROVIDE EFFECTIVE SUPERVISION

Quite obviously efficient and capable supervision is necessary for efficient performance in any organization. It is in the area of supervision of traffic law enforcement that some otherwise capable officers who have come up through the ranks are especially weak. Traffic is a relatively new field to police work. Many officers who are now in supervisory positions are men who received their training in police work in the early days of the automobile before it became such a serious problem. Their interests, therefore, lie primarily in the field of criminology. To some of these officers then the field of traffic law enforcement holds little or no interest. Many of our ranking police officers, however, have recognized the importance of traffic law enforcement to police work. Through study, training, and observation they have developed a keen sense of appreciation, knowledge and understanding of the traffic field. They have fully qualified themselves for capable leadership in the law enforcement field of today. They recognize that without a broad appreciation and understanding of all phases of police activity, their perspective as police officials would be limited and restricted. Those who early sensed the need for training in all branches of police work are now finding their services in demand, and it is a pleasure to note that many of them are today assuming leadership in the police field. They are to be commended for their vision and foresight.

Unfortunately, however, there still remain particularly in the lower ranks of police supervisors, a few officers who have failed to see

the need for broadening their viewpoint. Their interest in traffic law enforcement and other new police fields is therefore limited. They fail to see the importance of these fields to police work, and they are content to confine their activities largely to the field of their particular interest. Since because of their position as immediate supervisors of the field force, their attitudes and interests are reflected in the performance of their subordinates, and since this is the level at which the principal phase of police work is conducted, enforcement in these new police fields often suffers.

To assure efficient traffic police administration supervisory officers should have a full appreciation of the entire field of police work and a thorough understanding of police responsibility in every phase of police activity. Particularly is this necessary where both the responsibility and authority of all police work are vested in the area commander as proposed in the foregoing. This is not impossible of attainment, and can easily be achieved through proper training. Quite obviously this training must begin at the top and extend down through the ranks from inspectors, to captains, lieutenants and sergeants.

Assuming that the proper appreciation for traffic law enforcement has been developed among supervisory officers, careful supervision of all performance, reports, and complaints is as essential in traffic law enforcement as in the crime field. Sergeants must supervise patrolmen directing vehicles, regulating pedestrian traffic, investigating accidents, patrolling and performing other traffic control functions. Reports submitted by all officers must be properly supervised and performance standards must be maintained at a high level. Intelligent supervision is necessary to efficient performance.

4. TRAIN ALL POLICE OFFICERS

Present police problems demand a high type personnel. The capable administrator will make a careful selection of all applicants so that those selected will have the interest and aptitude for police work. Selection of commanding officers must be made with even greater care. Candidates for supervisory positions must be selected on the basis of their general abilities as a police officer, but they must also

possess the qualities of leadership. Their ability to plan and execute assignments must be considered. Promotion to additional responsibility should be based fairly on an officer's qualifications and merits.

Training of all police officers is equally important. Efficient performance can only be realized when all officers are adequately trained. Special consideration must be given to the training of supervisory officers whose duties have such a significant effect upon other police personnel. The training should equip officers with the knowledge and skill to perform all police duties. It should provide them with a thorough understanding of police responsibility in all branches of the enforcement field, and it should develop a proper attitude and appreciation of all police problems. Furthermore, the training school should develop a spirit of enthusiasm and zeal for police work.

In view of the present trends toward overspecialization, emphasis must be placed on the necessity for adequate training of *all* police officers in *all* phases of police work. Advocates of the specialized training theory would have us believe that traffic duty requires the acquisition of much special knowledge and skill not required of other police officers. We are further led to believe that basic police training does not satisfy the special requirements of traffic duty. Just what these special knowledge and skill requirements are is difficult to determine from a critical analysis of the duties of a traffic officer. Certainly the investigation of traffic accidents, the large majority of which involves neither injury nor death, is not more difficult than investigating and locating the subjects of burglaries, robberies, check passing and many other similar crimes. The proper direction and control of traffic is not so highly technical but that it can be taught to all officers in basic training school. In addition, it is believed unnecessary for traffic officers to have more training than other officers in dealing with the public. Principles of effective traffic patrol and parking enforcement are relatively simple and can be mastered by even the least educated officers. There appears, therefore, to be no basis in fact for the contention that traffic duty requires training which is not essential for the average police officer.

Police executives fully realize the value of versatile police personnel—officers who by training are prepared to perform any police

duty regardless of its nature. Adequate training and rotation of assignments to provide experience in all phases of police work make an organization capable of maximum performance.

It should be obvious that the training of all police officers in traffic control as well as all other phases of police work is essential to the efficient operation of a department organized under the unit area system previously outlined. When all police officers have been properly trained and indoctrinated and the authority for and responsibility of traffic control are returned to the area commander, then and only then may we expect to see the traffic problem receive its proportionate share of police effort.

5. OBTAIN NECESSARY EQUIPMENT

Sufficient equipment of the proper type, properly maintained, is a necessity in police work. A department cannot be expected to provide adequate coverage of a city street system unless it is fully mobilized. Furthermore, the necessity for apprehending speeders and other traffic violators demands that vehicles be in safe operating condition.

Experience has proved that both automobiles and motorcycles have certain advantages for traffic control, although it appears that the use of the motorcycle as a patrol vehicle is giving way to the automobile. The motorcycle, however, does have advantages over the automobile for such traffic duty as parking control, escort duty, and patrol in heavily congested areas.

Accident investigation demands a small amount of special equipment. The majority of accidents investigated will require little more than a steel measuring tape, notebook, and accident report forms. First aid kits and fire extinguishers are standard equipment for most police vehicles. In addition, all cars should be equipped with flares, fuses or other types of warning devices for use at accident scenes and in emergencies. A small portfolio and clip-board contribute to the preparation and maintenance of legible notes, reports, drawings, and other materials. Every department should be equipped with suitable camera equipment so that it may be obtained when the circumstances of the accident make pictures necessary. All equip-

ment should be maintained in good condition so that it will be available for immediate use. Frequent inspection should be made to assure proper care and maintenance.

6. SURVEY PERSONNEL ASSIGNMENTS

Maximum performance can only be achieved through the application of personnel on the basis of need. With limited personnel it is obvious that police officers cannot possibly apply sufficient enforcement effort to all locations at all times. Experience proves that assigning personnel to the high accident areas during the high accident frequency hours results in more effective administration and better accident prevention. Officers thus assigned should be advised of principal causes of accidents at that particular location and the violations which contribute most frequently to accidents. Obviously, accident experience and facts are the bases for such assignments. Consideration might also be given to traffic data such as traffic volumes, observance of speed limits and control regulations.

This method of personnel assignment is not new. It is nothing more than the application of common sense and good judgment. The assignment of personnel according to location, time and type of criminal activity is as old as law enforcement itself. If a series of night burglaries break out in a warehouse section, the Chief of Police is not going to assign officers to cover suburban and urban residential areas to prevent similar burglaries. Quite logically he will assign his officers to the location where the crimes have been committed, during the hours when they were committed, and will issue specific instructions to interrogate all suspicious persons who might have committed the burglaries. This is a logical common sense approach to the problem, and it works equally well in either criminal or traffic law enforcement.

Again it should be apparent that better traffic coverage will be secured in all areas when all men are trained for and have an understanding of the traffic problem. A more fluid organization results, and the sound principles of personnel assignment are more easily applied since all men are qualified to perform any police duty.

7. OBTAIN PUBLIC SUPPORT

Active public support is a vital element in successful law enforcement. Particularly is this true in the enforcement of traffic laws. Unless the police department has the confidence and respect of the public, enforcement is difficult. A friendly cooperative public makes the police job easier; it encourages efficient police work; it builds morale; it results in better working conditions and benefits to officers; it induces court cooperation; and it results in an over-all improvement in the standards of law enforcement as a profession. The objective of every public relations program should be the development of confidence, respect and good will among all citizens of the community for the police department.

The enforcement of traffic laws and the other traffic safety activities of the police department probably influence public relations more than any other phase of police work. Traffic laws touch the life of every person who walks or drives. The way a motorist is approached by an officer when stopped for a violation will determine largely the reaction of that motorist to the department. The tone of voice and the words used by the officer who stops a pedestrian crossing against the signal indication, will influence the attitudes of all people within hearing range of his voice. The appearance and stance of the officer directing traffic in the center of the intersection leave with those who see him the impression either of an efficient, businesslike organization or of a poorly trained department. The officer's consideration of the aged, the physically disabled, children and others unable to cross streets safely is an important factor in developing respect and good will for the police department. These are but a few of the ways in which every officer daily molds public opinion for or against himself and his department.

In the enforcement of traffic laws the officer's contacts are largely with the well-respected law-abiding citizens of the community. Contrast this with the usual type dealt with in criminal cases. In such instances the lower elements of society predominate. This immediately suggests another reason why contacts in traffic law enforcement must be beyond reproach.

Police cannot expect that public good will and confidence will

be spontaneous. It must be developed. One of the most effective methods for developing good public relations and avoiding unnecessary criticism is through improved contacts between officers and violators.

It is evident that an efficient, well-trained department will in itself create public confidence and respect. If efficiency and training are lacking, the development of public support is nearly impossible. Well-trained officers have a keen understanding of their relationship to the public. They know that theirs is a duty of public service. They are courteous. Their language and manner of speech are free from offensive or abusive comments. Their knowledge of and training for their job fully equip them for most effective public contact work.

Personal appearance, cleanliness and neatness are important factors in favorably influencing public support. Consideration must be given to the appearance of uniforms and all other equipment. The condition of headquarters and precinct stations must also favorably impress visitors. All offices and other quarters should be kept clean and presentable. Constant attention and frequent inspections by commanding officers will assure proper care.

Many citizens receive their only impression of the police department over the telephone. Telephone courtesy and the proper methods of receiving telephone calls justify careful consideration in the public relations program of any department. Police will find profitable the experience of private business concerns in improving telephone contacts. The person calling the department to report a complaint is as entitled to a proper hearing as any citizen reporting a complaint in person. He probably feels that his complaint is of utmost importance, otherwise he would not have called. Unless he is given sufficient opportunity to fully explain his complaint he may be resentful. The department should require that telephones be answered promptly and courteously, and that full consideration be given to the feelings of the party calling. A little effort will be worth while. Accident investigations afford an excellent opportunity for promoting good will. The care and treatment of injured persons, the unbiased approach of the officer to the investigation and a businesslike manner contribute to feelings of respect for and confidence in him.

Officers assigned to protecting school crossings may exert a powerful influence in building public support. The police officer who enjoys the friendship of the children on his beat will invariably have the support of their parents, and the department will benefit accordingly.

The whole field of safety education by the police is a splendid means of developing good public relations as well as promoting safety. Many means are available for disseminating information. The alert department will find opportunities for promoting safety and at the same time improving public relations. Probably one of the most effective direct means of influencing safe driving is through the individual contacts of officers with motorists and pedestrians who have violated a regulation. Herein lies opportunity for safety education of a most effective nature, because the circumstances are most favorable. It is obvious that the driver needs some instruction otherwise he would not have committed the violation. Leaving with him a message which will help to improve his driving can be most effective because it is possible to cite the hazards created by the violation.

The newspaper and other publications are exceptionally good instruments for teaching traffic safety. They probably exert a greater influence on public opinion than all other forms of public information. No effort should be spared to enlist the full support of radio officials and newspaper editors. These men are interested in improving the public welfare and will cooperate wholeheartedly with police chiefs in disseminating information on traffic safety. Pictures and a safety message are effective. Many papers carry a daily summary and analysis of the accident problem and present a comparison of this year's toll with that of last year to the same date. Editors frequently prepare editorials on safety, and cartoonists often depict by dramatic means the results of traffic accidents. New methods of enforcing traffic laws, new speed limits or traffic signals, the results of a special study at high accident locations, the obtaining of new equipment are but a few of the items which are of interest to newspapers. No police chief can afford to overlook the service which his community newspaper can render to traffic safety and his department.

The radio is an excellent weapon for use in promoting traffic safety. Few homes are without a radio today. Programs having musical entertainment or comedy are heard widely by the listening audience. It is evident then that one of the most effective uses of safety messages will be in the form of short safety scripts. Spot announcements following popular broadcasts are efficacious as are dramas and quiz programs. The latter, and round-table dicussions in which the participants are prominent local officials, may be utilized to good advantage. Probably the least effective safety broadcast is the safety talk yet this is the most frequent type used according to one survey. Sufficient successful traffic safety broadcasts have been conducted to prove that they are of value.

Leaflets, printed cards, posters and charts are useful. Many departments distribute a printed courtesy card warning pedestrians and motorists of the hazards of violations. The "throw-away" leaflet containing a brief message is one of the commonly used methods of commercial advertising which police have found useful in traffic safety. Posters and charts of various sizes have been used effectively as display cards on automobiles, in street cars and buses, and in public places.

The motion picture is another powerful instrument for promoting safety education. Some full length movies on traffic safety have been prepared, but most of the available films on traffic safety are short features suitable principally for showing before small gatherings. These are but a few of the most common media available to the alert chief of police for promoting safety education and obtaining better public support for his department. Practically all of these methods of public safety education are available to every department. The extent to which they are utilized will have a large effect on the success of the traffic control progress.

New York City Tackles Parking Problem

BY ARTHUR W. WALLANDER

Mr. Wallander is Police Commissioner of New York City. For twenty-two years he was an instructor in the Police Training School of New York's Police Department. He served through the police grades of sergeant, lieutenant and captain. He was appointed an inspector of police in 1938 and deputy chief inspector in 1941. His appointment as Commissioner came in 1945.

ONE OF the principal causes of traffic congestion in New York City is the parking problem. This can be attributed to the enormous number of vehicles that daily converge in the business section in which there are insufficient off-street parking facilities. Traffic volume counts conducted by the Police Department and the Bridge and Tunnel Authorities on toll-paying traffic arteries leading into Manhattan give a general idea of the problem. During the average business day this year, the traffic volume for these arteries was 212,000 vehicles as compared with 192,000 in 1945. These figures do not include the daily average of 222,000 vehicles crossing the East River bridges between Manhattan and Brooklyn and 21,000 using the ferries.

The marked increase in traffic becomes more apparent when we consider that figures for the toll-paying arteries, together with that of the city ferries, for the first three months of this year, were 17,224,485 vehicles as compared with a total of 10,876,454 for the first three months of 1945—an increase of 6,348,031 or 58%.

There are 750,000 registered vehicles in the City of New York alone. This number continues to increase daily so that we must expect the city registration will soon equal and perhaps exceed the peak year of 1941, when there were over one million registered vehicles in the City. A large proportion of this traffic enters the Borough of Manhattan, which contains the principal business and industry of the City.

In the Midtown Manhattan area, which includes all territory

from 14th Street to 59th Street between Third Avenue and Ninth Avenue, are located the Long Island and Pennsylvania Railroad Station, Grand Central Terminal, the airline terminals, the fur, garment, dress and suit industries, the theatrical district, and the principal retail shopping center of the City, besides the most heavily used subway stations, the principal hotels and the principal interstate bus terminals.

The Downtown Manhattan area bounded by West Houston, East Houston, Bowery, New Bowery, Brooklyn Bridge, Water Street, Coenties Slip, Front Street, State Street, Battery Place, and West Street, is also heavily congested. In this area are located the financial district, the important trucking terminals, ferry terminals, approaches to the East River Bridges, the Holland Tunnel, and West Side Highway as well as the Hudson & Manhattan Railroad Terminal, produce markets, and piers on both the North and East Rivers.

Counts conducted by our Department show that during a twelve hour business day, from 7 A.M. to 7 P.M., there is an average of 285,000 vehicles on the sixteen north- and southbound traffic arteries in the Borough of Manhattan. Of this total the West Side Highway carries 50,000 vehicles and the Franklin D. Roosevelt Drive carries 30,500. In the center of the City, Park Avenue has the heaviest traffic volume with an average of 35,000 vehicles during this twelve hour period.

Surveys conducted by the Department reveal that in the Midtown and Downtown Manhattan areas there are off-street parking facilities for approximately 20,000 vehicles. The limited number of these parking facilities is due in great measure to the fact that a large amount of the garage space available in the pre-war years was converted to other uses during the war period when comparatively few vehicles were in operation. While there is a slight increase in the use of open-air parking lots it has not been sufficient to compensate for the loss of garage space.

The lack of off-street parking facilities resulted in increased curb parking in violation of Traffic Regulations. This further resulted in frequent double parking by commercial vehicles while making deliveries, to the great detriment of moving traffic.

The parking situation is aggravated by various related factors outstanding among which is the presence of tall business buildings erected along narrow streets, for which no provision for off-street loading or unloading has been made. The extremely poor facilities for handling merchandise in transit at these buildings, particularly the lack of adequate freight elevator service which necessitates loading and unloading at the curb, materially adds to traffic congestion. The operation of large trailer trucks in congested sections, under such circumstances, further complicates the problem.

Additional difficulty arises from the adoption of the five-day work week now in effect by practically all business firms of the City. This means performing in five days the work heretofore accomplished in six, thereby proportionately increasing the traffic volume.

In dealing with the traffic situation the Police Department proceeds on the principle that the safe and orderly movement of traffic is essential to the economic life of the City. To meet the problem of increased congestion resulting from increasing traffic volume, some drastic measures had to be adopted.

Seven crosstown streets in the mid-Manhattan area were designated "express streets," on which all parking is prohibited during business hours.

To relieve the pressure of heavy trucking on crosstown streets and providing additional curb space for commercial vehicles while loading and unloading, additional parking restrictions were found necessary on some of the principal north- and southbound thoroughfares in this area. Parking restrictions to a great extent are now effective throughout the entire midtown area.

The establishment of "express streets" greatly facilitated the movement of traffic, but surveys showed considerable parking violations on other streets, as well as violations by commercial vehicles of the "parallel to the curb" and "two hour limit" rules governing such vehicles while loading and unloading. A program of complete enforcement was therefore decided upon.

The first phase of this program was the adoption of a conspicuous "no parking" sign for the midtown area. These signs are similar to those used on "express streets." They are square shaped in two colors with the words "no parking" in red and the rest of the

lettering in black. This sign has been found more effective than the old type arrow sign.

A large force of Recruits from the Police Academy was assigned to cover the area to prevent all parking violations and issue warnings to offenders. These Recruits received thorough instructions in their duties and serve under close supervision of superior officers of the Traffic Division.

This warning phase of the program began on October 1st, 1946. Following a two week period of warning—of which His Honor the Mayor in a press release fully warned the public—rigid enforcement will be continuous by experienced members of the Traffic Division.

In an appeal for the whole-hearted cooperation of the public, His Honor the Mayor stated:

> "Slow movement of traffic to a large extent is caused by non-observance of Traffic Regulations. It is to the interest of the public and business in general that traffic should move expeditiously and safely, and this can only be accomplished by faithful obedience to Traffic Regulations."

Surveys by our Engineering Bureau found changes to be necessary in the timing cycle of control lights in order to increase fluidity on crosstown streets. Re-timing has been effected at 670 intersections, increasing the crosstown cycle period by five seconds.

The assignment of a special day squad to 34th Street has considerably improved the traffic flow on this principal crosstown link between the Queens Midtown Manhattan Tunnel on the east side, and the Pennsylvania Railroad Station and Lincoln Tunnel on the west side.

The cooperation of public utility corporations has been obtained in scheduling their public street operations before and after the peak traffic hours.

Parking restrictions have also been found necessary throughout the downtown Manhattan area. Special control measures were adopted for Canal Street, which is the main crosstown traffic artery leading from the Manhattan Bridge on the east side to the Holland Tunnel and West Side Highway. The assignment of a special day squad to this thoroughfare has resulted in a decided improvement.

The assignment of two-way radio cars and portable radio trans-

mitters has been found very effective in spotting congestion and establishing detours on the heavily traveled East River Bridges connecting Manhattan and Brooklyn.

Through the cooperation of the Department of Public Works tow trucks are now strategically located for the prompt removal of disabled vehicles from the Manhattan Bridge and the West Side Highway.

The net result of these and many other measures has been a decided improvement in the over-all traffic picture. However, the problem of providing adequate off-street parking facilities, of necessity, awaits solution.

Many suggestions from various sources have been offered in connection with this problem. Most of these suggestions follow the lines of long-range planning. They include plans for sub-surface garages under public parks and squares; utilization of certain subway promenades and terminal garages at the perimeter of congested areas.

The Police Department strongly advocates some plan of off-street parking as the solution of the problem. The Department, however, realizes that before the difficulties of engineering, construction and financing have been overcome there is the danger that the continuously increasing traffic volume will have reached or exceeded the saturation point experienced in 1941.

With this thought in mind and realizing the necessity for prompt action the Police Department is conducting a survey of vacant lots and unused properties in and adjoining the congested sections that might be utilized as parking spaces with a minimum of expense and delay. To date six such locations have been spotted in the Midtown Manhattan area. A report thereon has been referred to the City Planning Commission for consideration in conjunction with their general survey. The survey is continuing in the Downtown Manhattan area. The sites located would provide parking space for 574 cars. This space should accommodate about 1,700 short-term parkers or shoppers during a normal business day.

While this plan is not intended as a solution to the problem, nor will the capacity of the sites meet the urgent present-day requirements, nevertheless their operation as parking lots by a city agency will serve as a guide in the matter of charges and overhead in the

development of an extensive program. Besides, the plan would provide a measure of prompt relief for the present urgent situation.

Additional measures now being implemented or projected dealing with traffic flow and parking problems include: Substantial increase to the personnel of the Traffic Division; refresher courses on traffic problems for members of the Traffic Division; installation of modern equipment in the Traffic Light Control Station; replacement of non-illuminated signs with the reflectorized type; additional traffic control light installations; and the establishment of communication systems on bridges crossing the East River.

Other measures necessary will require the removal of trolley tracks from certain East River bridges to provide additional traffic lanes, and the enactment of legislation or adoption of Zoning Resolutions to require off-street loading and unloading facilities for all new or converted large business type buildings, as well as off-street parking facilities for large hotels, apartments, hospitals and office buildings erected within the congested areas.

It is believed that with the complete cooperation of truck operators and shippers, a stagger system of shipments and deliveries for large buildings could be worked out to the mutual advantage of all concerned.

Loading and unloading terminals for excessively large trucks outside the congested areas, with deliveries to and from such terminals by small trucks might well be found more efficient and economical than the present method of using these large trucks in congested areas.

Progressive Treatment of Parking Problems

BY WILBUR S. SMITH
AND CHARLES S. LE CRAW, JR.

THE citizen's comment, "This parking problem is getting awful," is as common today as the expressions, "Speed causes most accidents. . . . People who drink should not drive. . . . The way to solve the traffic problem is to put new heads on drivers"—*ad infinitum*. The public reference to parking is the most accurate. Casual observation in any downtown urban area reveals the inadequacy of parking space and the serious hindrance of parked vehicles to moving traffic.

Many remedies have been suggested; some have been applied. Some proved effective; others failed miserably. Public officials, business men, commercial operators and private drivers recognize the seriousness of the parking problem and the even greater seriousness which threatens. They agree that something needs to be done, and quickly. Severe remedies are frequently taken or proposed. Many partial or temporary solutions are confounded by conflicting interests and unsound opinions.

No panacea can be offered. No plan or group of plans is known which will solve all parking problems. Many empirical correctives are known; other solutions are apparent. What is needed is a progressive approach, based upon surveys and factual studies. In such an approach, opinions will be eliminated. Such studies, which are factual, will present an overall picture of the problem and will indicate initial steps to be taken with related, progressive measures to follow to a reasonably complete and satisfactory solution.

This article discusses a step by step plan of action which local officials may take in approaching a solution. Every city should recognize that the following procedures are necessary: basic surveys and studies; comprehensive and rational regulations; a maximum use of curb spaces which takes into account moving traffic as well as parking demands, and off-street facilities to supplement curb spaces.

Details and more complete explanations of the various approaches are contained in a monograph, "A Study of Vehicular Parking," now being published by the Eno Foundation for Highway Traffic Control.

SURVEYS AND STUDIES A FIRST ESSENTIAL

Usually so many different groups and individuals are interested in parking facilities that a parking problem is apt to be approached from the standpoint of group desires and invalid opinions rather than from the standpoint of factual needs and obligations. Many communities completely overlook the fact that information on parking can be determined accurately through traffic engineering surveys.

No community should attempt to set in motion a plan to improve its parking conditions without first ascertaining basic facts on modes of transportation, existing enforcement practices, physical facilities including curb and off-street spaces, existing and potential parking demands, the tested experience of comparable cities, and the principal generators creating these demands. These can be measured by means of the following surveys and studies:

Physical Inventories

Curb Spaces

An inventory of curb facilities will show the location of curb space available for parking; physical restrictions to parking such as crosswalks, fire hydrant zones, hotel entrances, areas near intersections and the like; and legal restrictions based on the existing regulations of curb parking.

Off-Street Areas

A listing of available off-street parking facilities (lots and garages of all types) will determine the number and types of available facilities; capacity, land area, and total area of each facility; occupation by period of the day, turnover, and schedule of charges.

Potential Off-Street Parking Areas

Unused land in the central district of the city should be inventoried. Vacant property, property in the rear of business estab-

lishments, and property containing run-down buildings which might be condemned, should be studied. Assessed valuations of such land should be obtained; assessments become more realistic in considering development of parking facilities when converted to show the value of each square foot. These values should be entered on a map of the area and each parcel studied as a potential off-street parking facility.

Existing parking spaces as well as those potentially available are known from the above inventories. Obviously, no parking plan can be developed without this information.

Curb and Off-Street Usages

A survey of the detailed use of curb and off-street parking space will show the parking habits of the community. Such studies will show the average duration of parking by various hours of the day, the turnover obtained (or the number of vehicles accommodated in any one parking space), and violations of space and time regulations. By relating data recorded on curb uses to time and space regulations, it is not difficult to determine whether or not enforcement deficiencies prevail. Additional correlation of the information as to usage can be made with police records of parking enforcement and accidents in order to evaluate the level of enforcement and to determine the need for changing regulations.

Accidents Involving Parking

A study of accident records will uncover valuable parking information. The distribution and concentration of accidents in which parked cars or cars entering and leaving parking spaces are involved can be ascertained by reviewing accident reports or from special accident spot maps. A careful study of accidents may show, in addition, mishaps attributable in part to parking, yet in which parking vehicles are not involved; many pedestrian accidents and sideswipe collisions are so classified.

Influence of Curb Parking on Traffic Operations

The influences of parking on traffic movement are usually measured through "speed and delay" or "spot speed" studies. The overall

running time on particular streets has been used as an effective measure for certain classes of traffic; buses, street cars, and trucks, for example. These studies should always be completed before parking changes are made in order to determine the effectiveness of the change.

Intersection delay and volume counts might also be applied in studying the influence of parking on traffic movement.

Parking Demands

In order to determine accurately the demand for parking space by various periods of the day, it is necessary to conduct three comprehensive studies:

Cordon Count

This survey is made to determine the volume of traffic movement into and out of a certain area, usually the central business district. From this study it is possible to determine the concentrations of vehicles and persons within the given area. Such concentrations give an indication of *total* existing, or current demand for parking space within the area. If repeated over a period of years, cordon counts will show trends in parking and transportation characteristics which are significant in planning.

Figures 1 and 2 show typical graphic presentations of information obtained by a cordon count. Figure 1 shows the total vehicles inbound and outbound by various periods of the day. From this data, the total accumulation of vehicles within the cordon at any time can be obtained. Figure 2 shows the total inbound and outbound vehicles of various types and at different streets during the entire cordon count.

Origin and Destination

In order to relate the demands for parking space to the buildings and areas in the business district which draw traffic to them, a study can be made to determine the destinations of persons visiting the district. These studies are valuable both in ascertaining such generating influences of small sections of the business district and in

showing the use of routes and streets with regard to travel to and from the districts.

Various methods may be used to determine the origin and destination of traffic. Sampling techniques and methods for interviewing persons in their homes and places of business were developed

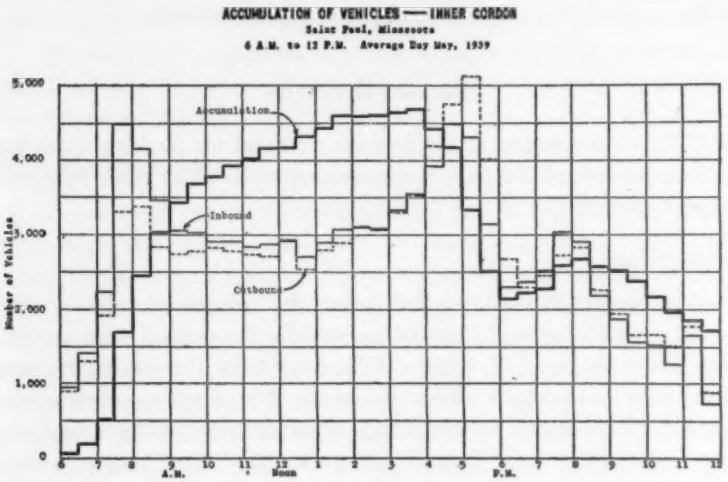

FIGURE 1

by the U. S. Public Roads Administration. A representative sample of traffic can be obtained, and from interviews an accurate prediction made of the actual traffic generated within various sections of the congested area.

The older and more conventional methods of conducting origin and destination surveys involve the interview of all, or a representative portion, of traffic which uses certain routes or streets. Several agencies are now working on photographic methods for studying origins and destinations, but thus far no satisfactory results have been obtained for large areas.

Curb Interviews

Recently, studies have been made which involve the questioning of all parkers at the curb and in off-street facilities within a certain

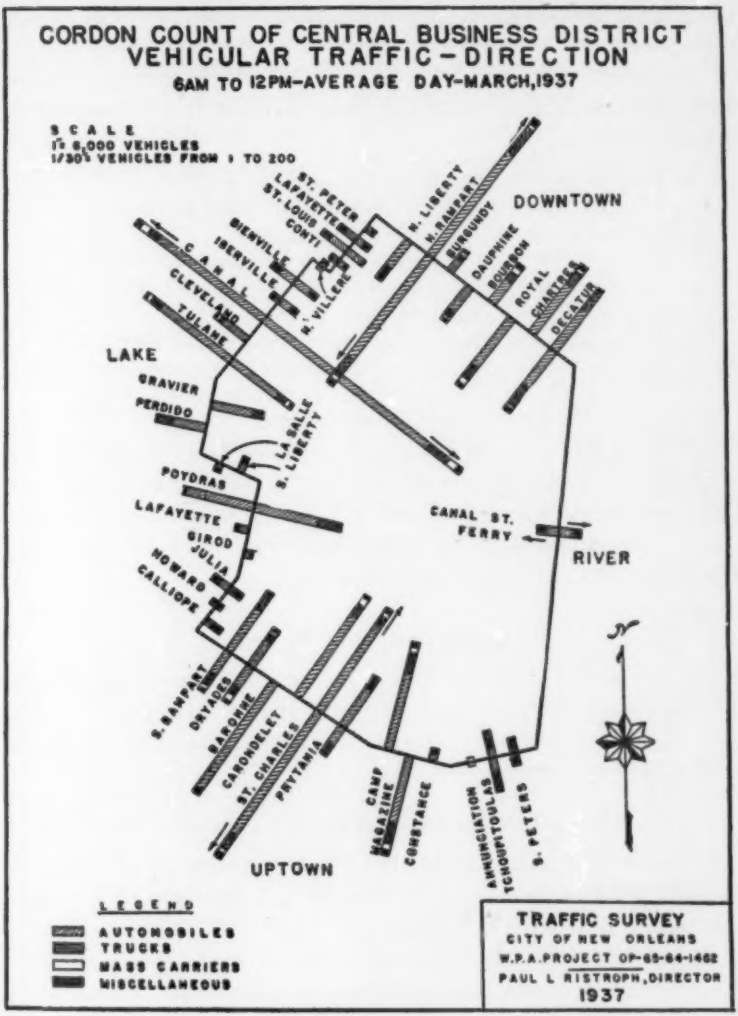

FIGURE 2

section. Boy Scouts and other volunteer workers have been used effectively to obtain the information through a personal interview at the time the person parks. Origin and destination, as well as curb parking habits and practices can be obtained. Of particular sig-

nificance is the information obtained on specific generators. Sampling has not been found to be effective in this type of study.

From these studies, facts are learned which replace opinions or guesswork. Data is obtained showing the following significant information:

1. Available parking space at the curb and off the street.
2. Influence of curb parking on accidents and traffic operations.
3. Potential space available for off-street parking.
4. Buildings and establishments which serve as traffic generators.
5. Concentrations of traffic by various periods of the day, and fluctuating demands based on concentrations.
6. Parking habits of persons visiting the central district.
7. How costs can be distributed on the basis of interests benefited.

None of the studies indicate accurately the potential demands for parking space within the central district. Inducements of new facilities and other factors which are usually intangible must be taken into account in this connection. The above studies, however, will provide data which are essential to a logical approach to marked improvement in most parking problems.

Before and After Studies

Many of the above studies should be repeated following any significant changes in parking regulations or facilities. This will provide the only means of obtaining factual evidence as to the results accomplished.

ORDINANCES AND REGULATIONS

Laws and ordinances provide the basis for all regulations. Effective control and accommodation of parking are dependent on reasonable, yet comprehensive, legislation.

Local ordinances and regulations pertaining to parking should be reviewed in order to ascertain their relation to current traffic needs, national standards, and state traffic codes.

Needs of the Community Based on Surveys

The surveys previously discussed will give a measure of the needs and desires of the motoring public. When possible, parking regulations should be adapted to fit these requirements.

Model Municipal Traffic Ordinance

The National Conference on Street and Highway Safety has developed uniform traffic codes and a model traffic ordinance. Work on the ordinance has extended over many years and represents the experiences of a large group of cities. Every city would do well to check its parking ordinances with the provisions contained in the Model Ordinance. It must be kept in mind, however, that city ordinances must conform with state codes. Basic provisions and controls of the state traffic laws should be checked before adopting the Model Ordinance.

State Laws

As indicated above, cities should study their parking regulations and ordinances in the light of state laws to determine if discrepancies exist between the two. In Connecticut, the State Attorney General has recently issued a ruling to the effect that municipalities cannot adopt the Model Traffic Ordinance due to variations between this ordinance and Connecticut state laws affecting traffic.

MAXIMUM UTILIZATION OF CURBS FOR PARKING

After making a survey of parking conditions and needs, and after revising basic laws and ordinances, attention should be turned to means of developing the greatest possible utility from curb parking. In this regard, it must always be remembered that the first responsibility of streets is to moving traffic and that drastic steps are often justified in controlling curb parking in order to improve traffic flow. Consideration should be given to the types of curb parking permitted, if any; to enforcement of parking regulations; to the use of enforcement aids such as meters; and to parking fines; if the best use is to be made of curb spaces.

Parking vs. Moving Traffic—Prohibition of Parking

In view of survey findings, it is important to investigate the relative value of curb space for parking as compared to the use of the space for traffic movement. Curb parking accommodates only a small percentage of the total street users. Maximum concern should be

directed toward providing reasonable movement. As in other traffic regulations, this is a case of restricting a few for the good of the masses.

If parking is prohibited, the lane adjacent to the curb cannot be used to maximum efficiency for moving traffic due to frequent stopping of vehicles to load and unload passengers, not to mention the likelihood of commercial loading and unloading.

Most merchants and land owners overlook the fact that if the parking spaces at the curb are provided according to the stores along business streets, there is rarely more than one space for each establishment. From this, it is obvious that parking restrictions cannot have serious effects on business. Parking was recently eliminated on a business street in St. Paul, Minnesota[1] and business has increased from 20 to 70 per cent; traffic congestion has been drastically reduced. Many other cases of parking control to improve traffic movement have been known to help business. People just naturally avoid congested areas.

In considering the prohibition of parking at the curb, it should be remembered that traffic demands vary widely, with morning and afternoon "peaks" causing most trouble. Often such conditions can be improved by prohibiting curb parking only during hours of peak traffic demand. Results of such practices reveal marked improvements.

Where parking cannot be eliminated entirely on a street, it may be possible to eliminate it on one side.

Parking prohibitions should take into account the needs of taxis, buses, commercial vehicles, and other special demands. Private autos constitute but one part of the traffic stream.

Angle vs. Parallel Parking

Angle parking permits accommodations of a few more vehicles at the curb, but this increase is obtained at the expense of moving traffic and at the risk of more accidents. Parallel parking allows fewer park-

[1] Information furnished by Mr. J. E. P. Darrell, Asst. Traffic Eng. Minn. State Hwy. Dept.

ing stalls per unit of curb space but permits more freedom of movement. A few simple facts about the two types:

"Angle": Easy to park; difficult to unpark; blind spot creates hazard; more accidents caused; women usually prefer angle parking; good if the road is sufficiently wide and traffic light.

"Parallel": Requires backing maneuver to park; comparatively easy to unpark; good visibility; passengers can dismount directly to the sidewalk, not through gutter; usually induces fewer accidents than angle parking; slightly reduces number of spaces at curb; greatly expedites traffic movements.

Table I shows the number of stalls which are available within 100 feet of curb spaces for parking average length cars at various angles to the curb.

Table I

PARKING SPACES PER 100 FEET OF CURB BY VARIOUS PARKING ANGLES

Angle (Degree)	*Spaces per 100 Feet*	*Stall Depth (Feet)*	*Total Road Space (Includes Maneuvering)*
90	12	17	40
75	12	17	36
60	11	17	32
55	10	16	29
50	9	16	27
45	9	16	25
40	8	15	24
35	7	14	23
30	6	13	22
25	4	12	21
20	4	11	20
Parallel	5	8	15

Enforcement of Curb Parking

Much police manpower and equipment are necessary to enforce curb parking regulations. However, reasonable turnover in curb use and proper observance of space positions cannot be obtained without adequate enforcement. No town can expect good use of curb spaces unless its parking regulations are rigidly and impartially enforced—assuming, of course, that the regulations are proper.

Administrators should see that the enforcement methods best suited to the community are employed and that the necessary equipment is provided to this end. A few facts about several parking enforcement methods may be of interest.

Foot Patrol

This method of enforcing curb regulations is inducive to a thorough job, but it requires many officers to cover a large area.

Motor Patrol

Three-wheel motorcycles greatly increase the area of coverage of officers and are quite popular in the enforcement of parking regulations.

Side-car Motorcycle

Requires two men, one to operate motorcycle, the other to observe parking; good on streets with heavy traffic.

Mounted Police

Easy to detect violations such as double parking and illegal use of curb space as the officer can observe a large area from elevated position. Also good for pedestrian control and for crowds. Horses are expensive to train and maintain and are generally used only in large cities. However, they are becoming more popular each year in traffic work.

Towing and Impounding Parked Cars

The practice of towing away cars that are illegally parked is necessary in many areas to maintain an adequate movement of the traffic. While it may create some resentment and public ill-will, an impartial and steady enforcement policy will soon overcome these feelings. Impounding is one of the stringent actions that must be taken against double parking, parking in restricted zones, and parking in improper locations. Its use should normally be restricted largely to the business and congested districts of the city.

Parking Meters

In recent years, parking meters have become popular throughout the country. As shown in Table II, most of the installations of parking meters by 1945 had taken place in cities with populations over 10,000. Smaller cities had not installed many meters. Two-thirds of the cities with populations between 100,000 and 500,000, and over 40 per cent of cities with populations between 25,000 and 100,000 had meters operating.[8] Meters provide a new means of controlling traffic, an aid to police. They cannot bring into use additional curb spaces, however. Since they are largely self-enforcing, it is usually found that their installation creates greater turnover in curb parking and removes all-day or long-time parkers.

Table II

PARKING METERS BY SIZE OF MUNICIPALITY: 1945*

Population Group	*Total Number of Municipalities in the United States*	*Number of Metered Municipalities*	*Per Cent of Municipalities Metered*
Over 500,000	14	5	29%
250,000 to 500,000	23	14	61%
100,000 to 250,000	55	37	67%
50,000 to 100,000	107	47	44%
25,000 to 50,000	213	95	45%
10,000 to 25,000	665	147	22%
Under 10,000	15,675	129	1%
		474	

The legality of meters has been well established where their announced intent is for enforcement or control purposes. Since the "proof of the pudding is in the eating," it must be recognized that parking meters have served as a valuable aid to the enforcement of curb regulations and have thereby benefited traffic in many cities. Their installation should be well planned and developed progres-

[8] From Publication: "Parking Meters, Their Use For Traffic Control and Revenue," Municipal Finance Officers Association, March, 1946.

* Source of Information: Vehicular Parking Ltd.

sively on the basis of study. The use of meters should not be "overdone." A simple example is the crowding of an extra parking space near an intersection to get in one more meter. Regrets often come from such short-sighted practices.

Meters have also been used successfully on municipal parking lots. Their use reduces the cost of operating the lots. This in turn reduces the overhead and the rates required. An example of such use in Miami Beach, Florida, is shown in Figure 3.

Income from meters, which approximates $75 a year for each meter, should be earmarked for traffic improvements. It is unfair to charge for the use of public ways unless profits go to bettering traffic and terminal facilities.

Parking Penalties

Every city should check its parking penalties, as assessed by the courts and as found in collateral schedules. While many parking violations do not create especial hazards, others can be the cause of serious accidents. Severity of violation should, therefore, be considered in fixing penalties. "Ticket-fixing," lax public attitudes about parking violations, and parking "repeaters" should be investigated. Proper backing by the courts is essential to the successful enforcement of all traffic laws.

Maintaining Signs and Markings

Parking areas should be well marked with paint and signs showing time limits, and other regulations. Especial attention should be given to control devices at loading zones, fire hydrants, hotel and theater entrances, areas near intersections, transit stops, and pedestrian crosswalks.

Other Traffic Controls

Speed control, signal coordination, transit routing, loading platforms, street lighting and other traffic controls should be improved along with parking improvements. Success of one is usually dependent on the other.

Photograph courtesy of Automotive Safety Foundation

FIGURE 3

Miami Beach uses Parking Meters in a municipal parking lot.

Photograph courtesy Kansas City, Kansas

FIGURE 4

"Off-street facilities must be provided to supplement curb spaces and allow proper use of streets by moving traffic."

Off-Street Facilities

As has often been said, "The parking problem cannot be solved at the curb." After obtaining maximum utilization of the curbs, public officials should turn their attention to the development of off-street facilities.

Provision for adequate off-street parking space is a problem which faces the majority of our urban areas. Studies indicate that the number of off-street parking spaces now available varies from 5 per cent to 30 per cent of the registered vehicles. The problem involves not only the provision of sufficient space, but of space properly located with relation to areas of concentrated land use and space attractively priced so as to be accepted by the motoring public. These qualifications were recognized as early as 1923 at the National Conference on City Planning where it was stated that parking rates must not be "too high to be popular" nor parking locations "haphazard and illogical."[8]

Due to the increase in private car operation and the public demand for parking space, it is in many instances less expensive for the municipality to provide off-street parking facilities than to attempt to solve the problem by widening streets. Under certain conditions, it is conceivably cheaper for a municipality to provide off-street parking for cars which demand short parking periods. An excellent example of a municipal parking facility is shown in Figure 4.

Many cities have successfully attacked the problem of off-street parking facilities through use of zoning powers. Facilities for off-street parking may be required in connection with new buildings of any type. While this does not solve the immediate problem, it provides facilities for parking the traffic which is generated by the new businesses. A study of zoning ordinances affecting off-street parking and loading facilities is reported elsewhere in this publication.

This subject is extremely large and involved. Matters of development and ownership and operation of the facilities, methods of finance, types of facility, legal aspects, and location of facilities are some of the things which must be considered and solved. Much help

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[8] "Day and Night Storage and Parking of Motor Vehicles," Hugh E. Young, Proceedings, 15th National Conference on City Planning. (1923).

can be obtained from publications and fixed procedures, but cities should seek technically qualified persons to assist local officials, if proper facilities are to be provided where needed. Lay opinion is not enough.

ROUTE PLANNING

Urban expressways which are now being planned in many cities will generate large volumes of traffic, creating greater needs for parking facilities. Care should be taken to plan and design off-street parking and terminal facilities which will accommodate the traffic loads developed by expressways in certain areas. Expressway plans which do not take into account parking needs, are apt to create conditions more severe than those which they remedy. It is now apparent that parking and terminal accommodations constitute an integral part of a highway transportation system.

CONCLUSIONS

Hit-and-miss treatments are not apt to provide appreciable relief of the parking problem. Technical surveys and studies are required to evaluate needs and insure a proper approach. Modern and reasonable laws and ordinances are a basic requirement in the regulation and development of parking. Maximum utilization should be made of curb spaces, but parking should not be allowed to seriously interfere with the movement and safety of traffic. Public attention should be given to the provision of off-street parking facilities to supplement curb spaces. Only a small fraction of the parking demand is normally met at the curb in business districts. Route planning and development should take into account parking and terminal needs as well as needs for moving traffic. Advice and assistance of technical people should be sought by city authorities in studying and treating their traffic ills.

The Pedestrian in Traffic

BY ERNEST L. BAILEY

For several years Mr. Bailey was Chief Road Commissioner of the State of West Virginia. He now is a consulting civil engineer at Charleston, West Virginia. He served as a member of the Eno Foundation Committee on Highway Engineering design.

EVERY normal person is inherently a pedestrian. It is as a pedestrian that he functions as a human being, joins with his fellowmen in the pursuit of happiness and earns his daily bread.

But in present-day America, geared by necessity to a high speed motor-vehicle economy, the pedestrian fares badly.

If the record for the last half of this year proves to be as bad as that for the first half something over ten thousand pedestrians will be killed in traffic accidents in 1946.

If the statistics run true to form, when the record has been compiled from reports painstakingly made by conscientious enforcement officers throughout the nation, an analysis will prove conclusively that in ninety-nine out of every one hundred cases the accident was either the fault of the driver or of the pedestrian himself; and there the tragic chapter of pedestrian highway accident history for this year will end and the Grim Reaper, with a sardonic smile, will turn another page and start a new chapter.

Those of you who, as a matter of either duty or research, have examined large numbers of accident reports will agree that faulty or inadequate highway design is rarely shown as either the primary or contributing cause of an accident. It is not shown because the investigating officer is not an engineer and therefore takes the design for granted. In any event it is not in his department and there is nothing he can do about it.

The human and economic loss is too great to simply brush the matter aside as due to either the fault or ignorance of the unfortunate victims. We cannot stop here and honestly continue to hold ourselves out as a benign civilization with an enlightened government sincerely interested in and alert to the safety of its citizens.

Brilliant minds have explored the subject; "specifics" have been

formulated, reams have been written, comparatively little has been done.

Why? For the simple reason, I think, that our great highway system, which has revolutionized our National economy, is, after all, a matter of comparatively recent growth. It is just now beginning to reach maturity.

It was necessarily and perhaps properly designed with one aim—to carry motor-vehicles as safely and as rapidly as available construction money permitted; and as the manufacturers turned out motor cars and trucks in progressively greater numbers with constantly increasing load capacities and faster and still faster speeds, the designing engineer was hard pressed to keep abreast of the constantly changing technology in his own field. Motor vehicles were his sole concern. He was and still is designing roads for motor-vehicles only; fast, durable and frequently beautiful roads on which the pedestrian actually has no place.

Perhaps something more may be done toward pedestrian safety by increased regulation, possibly something more by specific education. Both are good safety devices and should not be neglected, but in many cases they fail to reach the root of the problem. It is neither possible nor feasible to keep a policeman at every point of hazard and a large percentage of pedestrians do not know how to drive and are therefore unable to fully evaluate the dangers of improperly walking on a highway.

The fact that better provisions have not been made for pedestrian safety is not due to the fact that our designing engineers do not know how to make such provisions; it is because they have not been instructed to do so by those who hold the purse-strings to the highway construction funds of the nation.

I have several times heard this general lack of provision for pedestrian safety defended on the ground that the motorist pays for the roads and that if the pedestrian wants to use them he should at least look out for himself. This reasoning is so obviously fallacious that I shall not waste your time in refuting it.

I am, however, convinced that if any substantial progress is to be brought about in the reduction of accidents to pedestrians on our roads, streets and highways, it will be necessary first to bring about

a broadened and enlarged concept of pedestrian importance; not only on the part of our designing engineers but also on the part of those charged with the responsibility for allocating the funds and writing the prescriptions. This includes not only Federal and State highway commissions, responsible municipal and county officials but members of Congress, state legislators and city councilmen, as well.

Our radio and newspaper drives to better educate the pedestrian in looking out for his own safety and our laws and regulations forbidding and penalizing unsafe pedestrian practices, will ring a lot truer when we, the engineers, officials and legislators, have done all that we can reasonably do to help in the matter.

I have no illusions about the time which will be required for effective results from a program designed to build improved pedestrian safety into our highway system. I know that in dealing with public works "the mills of the gods grind slowly" but the sooner they start to grind the sooner will the grist be provided.

The first requisite to such a program is a competent, consistent and sustained leadership—a leadership which can cooperate with all interested agencies, not only on technical details and procedure but which can vitalize the program by engendering in these agencies a broadened vision of the social and economic importance of providing better safeguards for the pedestrian. In the absence of such leadership pedestrian safety will continue to lag; in the absence of such vision pedestrians will continue to perish.

It would be advantageous if this leadership could be furnished by a non-public organization which had no axes of any kind to grind. It seems to me that the initiation and fostering of such a program would be entirely consistent with the aims and ideals of The Eno Foundation.

If I have inadvertently left with you the idea that building greater safety for the pedestrian into our highway system is a simple, uncomplicated matter, free from technicalities and easy to carry out, I want now to correct that impression.

It is true that building sidewalks and pedestrian underpasses and overpasses poses no particular engineering difficulties but the question of "where" and "when" to build them, a question easily

susceptible of engineering determination, is usually left to the judgment of an individual or group which is almost totally lacking in concrete information upon which to base an intelligent decision.

Origin and destination surveys are just as useful and necessary to the engineer planning for pedestrian traffic as they are essential to the engineer planning for motor-vehicle traffic. Practically none have been made. It is possible that in many cases a mere study of population density would answer, but even these are relatively rare.

Assuming, however, that the engineer decides to make his own Origin and Destination, or population study, he is still without dependable standards as to how to apply the data to his particular problem. It is still a case for individual judgment unaided by a knowledge of minimum standards adopted and approved on the experience obtained from actual application.

If a more uniform system of accident reporting can be effected it will be possible to divide the highway system into segments of high and low accident-incidence. Expert studies may be made of high accident segments and usually the problem can be solved and a corrective applied.

The case history of this segment then becomes a pattern for future construction. We can be fairly sure that if we repeat the conditions which cause a certain type of accident we are setting the scene for another, or, conversely, when we correct the condition which caused an accident we eliminate repetition from that source.

City and urban centers have shown some improvements in the pedestrian accident rate. Rural areas show an increase.

To my mind, this fact is significant and points to the application of better engineering practices and improved pedestrian safeguards in cities, which have not been applied and are perhaps not fully applicable to rural areas. Equally effective substitutes should be devised and provided.

Another factor which enters importantly into planning for the safety of the pedestrian is an appraisal of the relative value of the time of the pedestrian and that of the motorist. A few progressive cities provide a brief interval for the pedestrian to cross at street intersections without danger of being run down. By common prac-

tice, however, we generally assume that the motorist's time is invaluable, while that of the pedestrian is utterly worthless.

When I am a motorist I enthusiastically subscribe to this view—when I am a pedestrian, I hotly reject it.

This matter deserves more study than it appears to have had. I am sure that all of you have seen, at many times and in many places, groups of pedestrians who were blocked from crossing the highway because of the continuous flow of traffic incident to changing shifts at a factory, industrial plant or mine which was located perhaps several miles distant.

The pedestrian was probably just as impatient to get home as the motorist but he had the choice between an interminable wait and risking his life in the traffic.

I do not advocate, and it is certainly not economical to stop a line of motorists every time a few pedestrians want to cross the road, but where conditions such as I have described exist, or where there are rural business or trading centers, or schools located on heavily traveled high-speed roads, it will usually be found feasible to construct a pedestrian underpass or overpass at a cost which will be fully justified by the saving in time, added convenience and greater safety of the citizens.

We need to construct thousands of miles of sidewalks in the more populous rural areas.

In new highway construction sidewalks and pedestrian underpasses should be made an integral part of the design.

When the design provides for these safety facilities to be built in during construction the increased cost to the project will be surprisingly small.

It is not good public policy to continue the present practice of trying to make roads safe and expeditious for the motorist at the expense of added hazards to the pedestrian, particularly when a proper design will provide for the safe and expeditious progress of both.

If improved pedestrian safety is to be built into our highway system it will be necessary to allocate to the work definite percentages of the construction fund.

The question will then arise as to a schedule of priorities for the expenditure of the money thus made available. Generally speaking, it should be spent where the least money will do the most good. The establishment of those points of high priority will require painstaking studies on the part of competent engineers.

The determination of these priorities may properly be made an added function of the planning departments only if existing motorist-minded personnel is supplemented and reinforced by competent engineers interested in pedestrian safety, skilled in its application and vested with adequate authority to see that it is provided for in the plans.

Finally, it will be necessary for the Congress and the state legislatures to arm the various Administrators with wide powers and unquestioned authority to carry out the program. In some states this will call for the repeal of restrictive laws and the enactment of new ones, particularly with reference to right-of-way condemnation and broadened construction authority and jurisdiction.

Perhaps the first task of any leadership which undertakes to launch an effective program of pedestrian safety will be the education of the law-makers.

If a program such as I have outlined, for building better pedestrian safety into highway construction is undertaken, it should be done with the full realization that the task is difficult, the road is long, but effective results are practically certain.

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